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A critically reflexive autoethnography of sustainable entrepreneurship in Scotland

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## List of Abbreviations

API: Application Programming Interface  
CIPA: Cost of Interconnection Prediction Algorithm  
CRM: Customer Relationship Management  
DNO: District Network Operator  
FIT: Feed-in Tariff  
GW: Gigawatt  
ICT: Information & Communication Technology  
IRR: Internal Rate of Return  
KPI: Key Performance Indicator  
kW: Kilowatt  
kWh: Kilowatt hour  
ML: Machine Learning  
MVP: Minimum Viable Product  
MW: Megawatt  
NDA: Non-Disclosure Agreement  
OHL: Overhead Line  
OSM: Open Street Map  
PPA: Power Purchase Agreement  
RE: Renewable Energy  
R&D: Research & Development  
ROI: Return on Investment  
VC: Venture Capital

## List of Acronyms

CARES: Community And Renewable Energy Scheme  
CERN: Conseil Européen pour la Recherche Nucléaire  
CES: Community Energy Scotland  
ECCC: Edinburgh Centre for Climate Change  
ECCI: Edinburgh Centre for Climate Innovation  
EIS: Enterprise Investment Scheme  
ESA: European Space Agency  
ECCI: Edinburgh Centre for Carbon Innovation  
GIB: UK Green Investment Bank  
GIF: Green Investment Forum  
GTM: Green Tech Meetup  
JHI: James Hutton Institute  
ITPOES: Industry Taskforce on Peak Oil & Energy Security  
LDT: Lesmahagow Development Trust  
MEIF5: Macquarie European Infrastructure Fund 5  
NSCOGI: North Seas Countries Offshore Grid Initiative  
PPN: Public Policy Network  
RO: Renewables Obligation
Abstract

We face an unprecedented climate crisis that urgently requires sustainable solutions. Sustainable entrepreneurship is one way that we can rapidly develop solutions to the climate crisis through the creation of sustainable ventures. However, in order for this form of entrepreneurship to be successful, we need to learn lessons from experiences and experiments to-date. But entrepreneurs themselves are often too busy on the job to carry out research or share their data, making it difficult to examine their work in-depth. In this PhD thesis I employ a reflexive autoethnographic method combined with a case study approach to investigate my own experience of sustainable venture creation. Presented using a ‘portfolio of papers’ format I draw on a wealth of data from personal archives to reflexively describe, analyze and compare three individual cases of sustainable venture creation that I led in Edinburgh, Scotland from 2009-2019. I employ a critical political economy framework to interweave each case, identifying cross-cutting themes that help make sense of the data. In the context of each case, I examine myself as both researcher and subject to present a personalized, contextual, critical account of my efforts to address the climate crisis through the medium of sustainable venture creation. I argue that reflexive autoethnography when combined with a case study approach can enable sustainable entrepreneurs to capture and share their experiences for others to learn from, in a manner that will complement and enrich their work, while providing detailed data about their experiences that is valuable to researchers. I further argue that a critical political economy perspective enables researchers and practitioners to go beyond narrow economic perspectives to identify crucial individual and state/market factors that greatly influence and shape the practice of sustainable entrepreneurship.
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Declaration

I hereby declare that this thesis is entirely my own work and that no part of it has been submitted for any other degree or qualification.
Prologue

I am a sustainable entrepreneur. But only recently, following a ten-year period experimenting with creating and leading new sustainable ventures, have I become aware of it. As a doctoral researcher I’m still in the process of trying to understand the individual drivers and contextual factors facing sustainable entrepreneurs as we strive to develop sustainable solutions in contrast to conventional entrepreneurs. As I continue to engage in this practice, I’m also trying to develop an analytical framework that will allow me to capture, analyze and compare the lessons I have learned along the way to aid my future efforts as well as those of others. While I will soon take a step back to embark on a new career as a Professor of Practice in sustainable finance and Executive Director of a new Climate Risk Lab at the University of Washington Foster School of Business, I will no doubt continue to view sustainable entrepreneurship as a practice that can advance the systematic changes we must make if we are going to leave our children and grandchildren with a habitable planet supported by thriving, diverse ecosystems and a stable climate. By undertaking doctoral research while continuing to practice entrepreneurship, I have been afforded an invaluable opportunity to reflexively examine myself in a wider political economic context, to reflect on my successes and failures, and to present my learnings to other practitioners and researchers. In doing so it is my hope that the insights derived from this research will be of use, not only in furthering my own practice, but to others in academic and practitioner communities who endeavour to design and implement urgently needed solutions to the climate crisis we are facing.

Carrying out doctoral research and being a sustainable entrepreneur simultaneously has created its fair share of emotional challenges. Covid-19 notwithstanding, I have spent the better part of the last year living life as a digital nomad—constantly on the go from country-to-country, city-to-city, in search of inspiring locations with plenty of sunshine and high-speed Internet. Along the way I have had and continue to have conversations with individuals from diverse backgrounds about the future of humanity in the context of the climate crisis. It seems that the vast majority of adults I encounter who have the courage to engage with this subject in-depth, are resigned to the view that we have already done irreversible damage to the planet and are very likely to continue to do so for years if not decades to come. On a professional level, I am hopeful that the case studies and analysis presented in this PhD thesis will be useful for helping those who take up the practice of sustainable entrepreneurship to anticipate hurdles and develop strategic plans that can lead to success, however they envision it. On a personal level, I hope that anyone who engages with this research finds reasons to be optimistic about the potential for sustainable entrepreneurship to catalyze much needed solutions with haste. There is still hope.

Not everyone has to employ a critical political economy framework in order to present their work in the form of case studies for reflexive autoethnographic investigation. However, I have found throughout this process that a critical political economy framework has helped me to rediscover the guiding principles that have driven me to take many leaps of faith in embracing sustainable venture creation as a career focus.
I have also come to understand through a critical political economic viewpoint that the nature of the challenges we face are mainly structural and therefore, addressable. Granted, it will require bravery and courage on behalf of those in positions of privilege to embrace sustainable practices in all areas of commercial activity. Those who benefit from the knowledge and foresight to understand what solutions are already proven to work in addressing the climate crisis have a moral obligation to do everything in their power to adopt these solutions without delay. Yet we continue to see unsustainable commercial activities in the most mature markets reaping record profits as greenhouse gas emissions reach historic highs. Where conventional entrepreneurs are obsessive about wealth creation and tend to focus on profitability at any cost, entrepreneurs who are serious about addressing the climate crisis aren’t afforded the same luxury and must play by different rules. Sustainable entrepreneurs must contend with the reality that conventional entrepreneurship is often part of the problem, contributing to accelerating climate change and ecosystems collapse. To be a sustainable entrepreneur means contending with a status quo, which rewards unsustainable practices.

Throughout the process of completing this PhD thesis, I have learned a great deal about my own capacity to make a positive difference in addressing the climate crisis through entrepreneurial action. When I view my past and present actions through the lens of critical political economy, I can clearly see where the common threads are between each case and perhaps even more importantly, I can see where I have adhered to or deviated from my core principles throughout my entrepreneurial journey. My future practice will no doubt be enriched by this research experience, as the record of what has come before is now almost complete and my reflexive engagement with the final analyses is evolving and teaching me new things about myself, and about the world. I do not yet know how other sustainable entrepreneurs will respond to the case findings and analyses I present here, but I hope to find the time and resources to share my work with the community, as well as with academic researchers, and to take the research forward in a joined up effort to further refine the methodology while encouraging others to produce and share their autoethnographic data for comparative analysis.

Adopting a critical political economy perspective while carrying out this research has also obligated me to consider the many barriers to sustainable entrepreneurship that remain influential at state/market-level. Large-scale, resource-intensive industrial development powered by fossil fuels is highly lucrative and supported by the policies and practices of many governments. While my approach to this research is focussed on the individual level of action, I have also commented on the structural factors that influenced my process when leading each of the three sustainable ventures. This is so that I can reflect on the policy implications myself and learn lessons from analysis.
that I may apply in the future. It is also so sustainable entrepreneurs who engage with this PhD thesis can get an understanding of the specific policies and stakeholder dynamics that shaped my experience and the opportunity landscape. I also intend to share this PhD thesis with Scottish government and UK government policy-makers so that they may gain new insight into how the various policies outlined in each case study chapter below impacted my efforts to lead each of the three sustainable ventures examined.

The first time anyone referred to me as an entrepreneur of the sustainable type or otherwise, was in 2009, the year my entrepreneurial journey first began. I remember the moment it happened. It was late morning on a Tuesday, and I was on the third floor of the Crystal Macmillan Building at the University of Edinburgh. The third floor is home to the Politics Department where I had been sharing an office with three other PhD candidates. I was about to wrap up another informative session with Elizabeth Bomberg, Professor of Environmental Politics. At the time, Elizabeth had been guiding me through the pros and cons of positivist approaches to political science research, when she remarked that my desire to act on the problems I identified while carrying out research was “very entrepreneurial.” Prior to being accepted into a PhD program at the University of Edinburgh I had only considered myself an academic in training – one with a developing interest in critical political economy and a deep concern about our worsening climate crisis. However, after this fateful conversation with Elizabeth, I began to develop a curiosity about the potential for entrepreneurship as a catalyst to help create and accelerate solutions to the climate crisis that took me beyond academic research into the practitioner realm. This culminated in my first foray into sustainable entrepreneurship with the creation of the ‘Sustainable Community Energy Network (SCENE),’ the details of which are discussed in Chapter 4. The feeling of empowerment and optimism that I gained from taking a leap of faith from researcher to practitioner has never left me and has helped me to cope with occasional feelings of helplessness and dread that accompany the experience of examining the root causes and harmful consequences of the climate crisis in-depth.

While my PhD in the Politics Department eventually resulted in an MSc, and my PhD in the Geography Department didn’t begin until 2015, I have throughout this time never lost sight of the value that doctoral research can also bring to the practice of sustainable entrepreneurship. My experience from 2009-2019 of starting up and leading three sustainable ventures has been fraught by existential questions along the way. These are questions concerning my sense of self and purpose, my relationship with nature and society, my moral values, my sense of responsibility, my personal identity and my outlook on life. However, when immersed in the chaos and uncertainty characteristic to entrepreneurial endeavour it can be incredibly difficult to find the time to adequately reflect upon these deeper questions that are fundamental to gaining a better understanding of myself. Creating a new sustainable venture and engaging in doctoral research are such radically divergent workstreams that this alone presents a challenge in terms of finding a way to step outside the day-to-day grind and into the realm of theory and reflexive analysis. However, I have found reflexive autoethnography particularly useful in that it has enabled me to draw upon a rich store of data from personal archives that may not otherwise be accessible to
researchers. I have yet to come across a better method that would have allowed me to describe in intimate detail the contextual circumstances and organizational processes with data derived from my experience, while immersed in practice. While a new venture, once created, can be studied and new knowledge about the experience of entrepreneurship can be ascertained through for example, in-depth interviews with a group of entrepreneurs followed by cross-case analysis, any attempt made by researchers on the outside to access the entrepreneurial process must be made a priori. Yet because sustainable entrepreneurship is a distinct and newly emergent phenomenon, data and case studies attained a posteriori that describe our underlying motivations and the processes we employ in practice is essential for understanding what types of individuals, institutions, incentives, and situational contexts can support the growth of the practice going forward.

I don’t recall who said it, but ‘begin with the end in mind’ is one of those pieces of advice that surfaces now and again in the entrepreneurial culture. I’ve always taken it to mean that one shouldn’t embark on creating a new venture without first considering the possible end game and exit scenarios. The entrepreneurial process is so deeply immersive and chaotic that to invest the necessary time, energy, and resources in taking an idea from conception to operation carries significant personal and professional risks. For conventional entrepreneurs, the end they have in mind is so often a big financial reward, that the dream of becoming extravagantly wealthy can drive them to keep going when times inevitably get tough. As I prepare to submit this PhD thesis, in looking back on all the experiences that have led me to this point, I can honestly say that big financial rewards have never been further from my mind. The urgent threat of climate change, in its many facets and manifestations, has always been and continues to be the primary driver of everything I do as both an entrepreneur and a doctoral researcher. After all, what good would amassing personal wealth serve in a world where climate volatility and biodiversity loss is so severe as to make difficult living conditions for the vast majority of living beings totally unbearable? As I have embarked on a career journey that combines doctoral research with entrepreneurial endeavour, I have done so in the hope that through continuous reengagement with theory and experimentation with practice I may come to a deeper understanding of the roots of this immense crisis we face as a species and to enact some effective solutions before it is too late.

My choice to employ a reflexive autoethnographic methodology in this PhD thesis combined with a case study approach, has enabled me to capture and share primary data from my experience as I go along. This approach is one that other sustainable entrepreneurs and researchers can follow. If sustainable entrepreneurship continues to be seen by governments, civil society groups and the private sector as one of the more viable means for addressing the climate crisis with adequate speed, then we must develop a deeper understanding of the underlying motivations, incentives, challenges, and opportunities that sustainable entrepreneurs face. Furthermore, we must understand how these differ from other forms of entrepreneurship. We must also understand what political economic factors have served to help or to hinder entrepreneurs along the way. This direction of research can serve to not only assist researchers with developing new approaches that enable them to uncover valuable
new insights but may also help policy-makers and other government decision-makers to create spaces for sustainable entrepreneurship to grow and thrive.

1. Chapter 1: introduction, aims and thesis structure

1.1 Introduction

Academic literature on the topic of sustainable entrepreneurship frequently points to environmental costs and market failures as the main drivers of sustainable venture creation (Dean & McMullen 2007; Dean & Castillo 2014). According to this consensus, the sustainable entrepreneur as an individual agent or actor, is understood to share many of the same motivations and values as conventional entrepreneurs, operating in a typical market, but with the exception being that products and services are created to address sustainability needs. Dean & McMullen (2007) follow that the practice of sustainable entrepreneurship is distinguishable from other emergent forms of mission- or values-driven, such as environmental entrepreneurship, where entrepreneurs participate in venture creation to further their vision of a more environmentally- and socially-just society (Gibb 2002; Shepherd & Patzelt 2011; Muñoz & Dimov 2015, 2017; Kaesehage & Leyshon 2018). Sustainable entrepreneurship is then classified according to the market-oriented values of entrepreneurship researchers with profit maximization seen as the primary aim of the practice (Dean & McMullen 2007; Dean & Castillo 2014). However, the question of what political economic factors, including individual ideologies drive individuals to distinctly create new sustainable ventures as well as what specific state/market structures shape their efforts remains relatively underdeveloped as a research topic (Tilley & Parrish 2009; Schlange 2009; Muñoz & Cohen 2018; Kaesehage & Leyshon, et al. 2019). This is understandable as the process of venture creation, or enacting entrepreneurship whether it be sustainability-oriented or otherwise, is difficult to observe and study on account of its rapidly shifting dynamics as well as the methodological challenge of capturing and presenting data detailing what entrepreneurs think and do on the job (Johannisson 2002, 2011; Steyaert 2011). A lack of empirical data from individual experience is a hindrance to researchers’ and practitioners’ efforts to explore deeper questions concerning the distinct nature of sustainable entrepreneurship.

Rosário, Raimundo & Cruz (2022) in, 'Sustainable Entrepreneurship: A Literature Review' provide a comprehensive analysis of sustainable entrepreneurship research as distinct field that has been evolving over the last twenty years. They explore the significance of the impact of this unique practice in advancing the aims of 'global sustainability' and explore within that context key terms and concepts in relation to entrepreneurship such as sustainable development, sustainable business model design and implications for the future emergence of sustainable ventures. They begin by acknowledging that the role of sustainable entrepreneurship is influenced by the operational environments or contexts in which the practice is situated including markets and institutional/ regulatory factors. Entrepreneurs demonstrate distinct 'sustainability concerns' based on their interaction levels with external actors while remaining opportunistic in capturing resources from their external environment in
order to stay competitive (p. 2). The authors highlight that there is limited evidence and a lack of comprehensive reviews on sustainable entrepreneurship; hence, the title and guiding rationale behind their work. Their review aims to holistically map and integrate traditional entrepreneurship literature with further sustainability issues, while also identifying gaps in this intersecting domain.

In order to assess the field's evolution as widely as possible, essentially on a 'global' scale, they employ a bibliometric literature review to ensure the validity and accuracy of the gathered data. Their review process follows six steps from formulating the research problem, searching for appropriate literature, critical appraisal of selected studies, data synthesis, reporting findings and recommendations, and presentation of the method in the form of a summary report (pp. 2-3). The authors conducted their literature search using the SCOPUS indexing online database and identified 329 documents related to sustainable entrepreneurship. The inclusion criteria further involved the thematic areas of business and management studies, accounting and behavioural studies, resulting in a final output that summarizes approximately 80 documents (p. 3). They include a bibliometric study that employs VOSviewer software to analyze the field dynamics, an approach which they argue provides a systematic account of trends in both sustainability and digital innovation (pp. 6-8). Their resulting analysis emphasizes the growing research interest in sustainable entrepreneurship among academic researchers in both the global north and global south, including critical drivers of sustainability-oriented entrepreneurial activity from climate change and resource scarcity to economic volatility (p. 8).

The authors highlight the importance of defining key terms and concepts related to sustainable entrepreneurship, particularly sustainable business models. They conclude by modelling trends and resources to help support the field in terms of funding, review boards and leading peer review channels, data availability and exploring prospective conflicts of interest with recommendations for further research. At a high-level this review sets the stage for more in-depth analysis of the underlying motives and drivers that help to explain the phenomenon of sustainable entrepreneurship from a variety of disciplinary perspectives.

In Murnieks, Klotz & Shepherd (2017), 'Entrepreneurial motivation: A review of the literature and an agenda for future research' the authors explore individual factors that influence decision-making of entrepreneurs when seeking to address sustainability challenges. Drawing on literature from the field of organizational behaviour (OB) the authors set forth the following aims for their work: firstly, they intend to provide a nomological network of the causes, types, consequences, mechanisms, and moderators associated with entrepreneurial motivation. They also aim to build a framework to connect the study of entrepreneurial motivation across a hypothesized 'three phases' of the new venture creation process (venture initiation, growth and exit). Additionally they seek to identify understudied motives that can explain meaningful variations in venture outcomes. Finally, the authors identify a need for additional methodological innovations in OB and related fields that may be useful in studying entrepreneurial motivation, particularly in light of more qualitative, personal
drivers related to what they term 'noneconomic' thinking and/or the pursuit of 'socioemotional wealth' (pp. 135-38).

To summarize, the authors outline several key findings and advancements in understanding entrepreneurial motivation that may help to further define sustainable entrepreneurship as a distinct field of practice from conventional entrepreneurship. They emphasize the need for comprehensive approaches that integrate multiple theories and frameworks to fully grasp the dynamics of entrepreneurial motivation (pp. 136-137). Finally, they highlight the importance of researchers considering individual and contextual factors, such as 'personality traits,' 'social networks,' and 'environmental conditions.' By integrating these factors, the authors propose a nuanced understanding of entrepreneurial motivation that acknowledges the complexity and diversity of sustainable ventures. They argue that focusing on motivation alone is insufficient and call for a more integrated approach that considers how motivation interacts with other aspects of entrepreneurship, such as opportunity recognition and venture creation. In conclusion they advocate for exploring new dimensions of entrepreneurial motivation in diverse cultural contexts in order to offer valuable insights and inspire practical advancement of the field for aiding further research (pp. 138-39).

In Kaesehage & Leyshon, et al. (2019), 'Seriously Personal: The Reasons that Motivate Entrepreneurs to Address Climate Change,' the authors provide a more granular, case analysis of entrepreneurial motivations amongst a sub-set of UK-based entrepreneurs who have enacted and/or attempted to address climate change through the medium of venture creation. They employ qualitative mixed-methods research in the form of interviews, observations, questionnaires and workshops to explore how different entrepreneurs have unique motivations based on their domain and type of activity (e.g. sector/industry, for-profit/not-for-profit) and level of maturity situated in subjectively-defined spatiotemporal contexts. One practical aim of their research is to inform better policy-making; the authors argue that policy-makers can create policies tailored to entrepreneurial needs, which can increase the number of entrepreneurs who actively engage in climate change mitigation activities (pp. 1087-1089). The authors recognize that motivations of entrepreneurs often vary, with some driven by personal aspirations for wealth or creating positive social benefits, and make the case that more case study research detailing specific contexts to better understand entrepreneurial motivations can help to further advance both the field and the practice of sustainable entrepreneurship (p. 1099).

Their study reveals that entrepreneurs consider their own understanding of themselves in relation to climate change and their normative positions regarding the future condition of people and planet. The practice of sustainable entrepreneurship is therefore socially embedded and require more socially embedded, climate-related policies in order to better encourage sustainable venture creation. Their analysis elucidates detailed secondary insights into the diverse factors that influence individual decision-making when it comes to sustainable venture creation. Their research identifies three types of climate entrepreneurs: Climate Opportunists, Traditional Entrepreneurs and Integrative Entrepreneurs. Climate Opportunists prioritize financial
considerations due to their ephemeral and incomplete understanding of climate change. Traditional Entrepreneurs are primarily motivated by socio-environmental factors, based on their generational perspectives of time and locational interpretation of climate change. Integrative Entrepreneurs demonstrate both financial considerations and socio-environmental motivations driven by their more fluid understanding of time and place as well as an integrated passion for the welfare of present and future generations. They map these motivations along a continuum to show how each individual’s spatiotemporal perspective influences their entrepreneurial decision-making and perspective with Climate Opportunists having short-term perspectives and comparatively limited outward focus on the wider socio-environmental impact of their work to traditional entrepreneurs who focus over longer timespans hold future visions that are comparatively more expansive (p. 1099). These findings suggest that the motivations of sustainable entrepreneurs are more diverse than has been hypothesized and also that motivations are intimately intertwined with an individual’s perception of self. The study concludes by restating the need for policy-makers to develop programs of incentives that consider the unique spatiotemporal perspectives and underlying diverse motivations of climate entrepreneurs according to their area of activity and chosen sector, with the ultimate aim being to encourage more entrepreneurial-driven solutions to climate change.

In Greco (2020), Changing for Good: Transforming Existing Organizations into Sustainable Enterprises, the author explores the challenges and opportunities of transitioning existing organizations into sustainable organizations. The author presents their research findings and addresses a series of research questions related to sustainable business model innovation, the influence of organizational identify on strategic decision-making and planning and attempts by organizations to mitigate the unintended consequences of business operations in the form of climate change and environmental and social degradation. Collaborative innovation is a primary focus, with emphasis placed on the actor-orientation of sustainability-oriented individuals (‘intrapreneurs’) within firms who can drive transformation through coalition-building and new product and services creation (pp. 24-26).

Similarly to this thesis, Greco’s thesis follows a portfolio of papers approach, structured with each chapter functioning as a stand-alone research article for peer review, with literature review covering the latest developments in sustainable entrepreneurship. The author contends that the field of sustainable entrepreneurship includes organizational innovation toward alignment with sustainable development goals, and emphasizes the need for more case study research into contextually-specific experiences of organizations navigating through their sustainability journey with an aim to focus on economic, social and environmental outcomes that are beneficial to stakeholders and shareholders (pp. 35-36). Her conclusions draw attention to the importance of interdisciplinary research and activist or 'rebellious' approaches to research where the researcher is both a participant in and the object of the research in order to hasten the evolution of urgently needed sustainable solutions (p. 28). Through a case-by-case examination exploring the insufficient rate of retrofitting buildings to meet the EU’s decarbonization targets to studying housing associations experiences in the Netherlands in their efforts to implement energy-
neutral strategies, Greco’s work aims to understand specifically how tightly regulated ‘hybrid organizations’ can produce and maintain business model innovation through the co-operation diverse stakeholders both within and outside the organization working together to advance a 'dual organizational identity' to address often conflicting goals of cost efficiency, profitability and sustainable development (pp. 24-28). Findings from the research provide practical value to EU policy-makers at local government level who aim to promote positive social and environmental change within inherently conservative organizations (e.g. housing associations). The study highlights the hierarchical nature of the so-called ‘triple bottom-line’ of economic, social and environmental return on investment with economic returns often taking precedent over both the former (p. 80). This may in turn challenge local organizations and regulators to adopt new methods of practice to overcome inertia in the advancement of their efforts to transition to a more environmentally- and socially-just business model.

In Kaesehage & Leyshon (2018), 'Breaking Traditions. How Entrepreneurs Create Communities to Address Climate Change,' the authors explore how entrepreneurs create social networks to address climate change. They set out to answer two research questions: (i) why do entrepreneurs address climate change in networks? (ii) how do entrepreneurs use network interactions to mitigate climate change? The method they employ to investigate involves an iterative approach to data analysis, with qualitative data collection from interviews with climate entrepreneurs (pp. 102-103). Data analysis reveals themes that are captured, analyzed and compared using a coding framework. The authors employ triangulation to ensure the validity of the data they have collected to support their findings.

Their findings are presented in a table that includes information about the entrepreneurs themselves who have volunteered for the study (pp. 111-114). It includes their industries, products/services, number of staff, year founded, positions held and duration of those positions. The authors highlight the importance of entrepreneurs' motivations and values in addressing climate change in their common stance against the socio-economic roots of overconsumption and unsustainable economic growth. The conclusion of their study suggests that additional research is needed to refine the approach to evaluating and categorizing entrepreneurs' belief systems, in the interest of advancing the field and also for anticipating how entrepreneurial activity may or may not result in positive social and environmental impacts (p. 123).

Their research, while acknowledging the limitations of sample size, highlights the critical importance of climate change communication and shared belief systems, as well as the role of entrepreneurial communities and social networks, language and identify (pp. 123-126). The authors argue that climate change policy-making should move beyond a top-down approach to supporting bottom-up sustainable solutions development and to focus on adapting to the diverse motivations and individual contextual circumstances that drive entrepreneurs to create new sustainable ventures. In sum, their work explores how entrepreneurial motivations may be shaped by their involvement in activist communities who aim to challenge the socio-economic
systems in which they are imbedded. The authors call for further research to expand research into how entrepreneurs form and choose to act up on their beliefs so that policy-making that aims to foster the growth of sustainable solutions can effectively align (pp. 131-132).

One gap in the sustainable entrepreneurship literature that can help with the development of farther- and deeper-reaching, analytical frameworks is that of critical political economy (Gramsci 1975; Baumol 1990; Cox & Hettne 1995; Strange 1996, 1998; Cox & Schechter 2002). By contrast to classical economics, including the sub-discipline of environmental economics, critical political economy perspectives do not seek to disentangle economic from political factors of analysis, but instead treat these as symbiotic (Granovetter 1985; Baumol 1990; Douhan & Magnus 2007). Critical political economy, the theoretical framework of analysis I employ in this thesis, focuses on state/market interactions where power relations between individuals and organizations shape and define overlapping affairs of government, business, and civil society. Through the (re)unification of economics with politics, I explore political economic themes and factors of analysis that are empirically relevant to both individuals at work in creating sustainable ventures as well as practitioners involved in policy-making. When viewed through the theoretical lens of critical political economy, both individual, reflexive positioning and state/market contexts can be explored simultaneously.

There is a rich tradition of case-making in political economy scholarship aimed at not only explaining entrepreneurship as a practice, but also promoting entrepreneurship as a practical method for solving complex social dilemmas, including climate change (Scholte 2000). Beginning with Schumpeter (1942), and following with Kirzner (1973; 1999) and Baumol (1990), each have sought to develop entrepreneurship research into a unique field of study that treats entrepreneurial action as a distinctly individualistic phenomenon with the potential to achieve extraordinary political economic outcomes. Yet, over time with the progression of market economics and theories of the firm, the political dimensions of entrepreneurship have been deemphasized in mainstream scholarship. One plausible explanation for this shift in emphasis away from political economy toward disembedded economics is that with the financialization of markets coming to prominence in the early 1970s-1980s (Strange 1996), economic theory came to supplant political economy theory in popularity as a result of its efficacy in advancing the interests of influential financiers (Harvey 2005). According to Harvey (2002) in his work 'Accumulation by Dispossession,' Milton Friedman’s policy activism at the University of Chicago was formative in advancing the political influence of a new political class, culminating at its apex with the rise of Reaganomics. This sparked a scholarly reaction among prominent political economists like Susan Strange (1996, 1997, 1998) and Robert W. Cox (2002) who developed substantial bodies of evidence-based work which aimed to make a case to the contrary that US monetary policy in the 1970s-1980s was implicitly an effort to empower the forces of finance as both a tool in US expansionism as well as a means of wealth attainment for a new 'neoliberal' economic class (Strange 1998; Cox & Schechter 2002). In my own experience of sustainable entrepreneurship, I have frequently encountered structural barriers to advancing
climate solutions through the medium of venture creation, in part owed to the institutionalization of market-oriented policy-making that is in part a consequence of the neoliberal economic paradigm which has dominated Western fiscal and monetary policy-making. While leading voices in government and industry have repeatedly argued that the climate crisis calls for solutions that are both environmentally sustainable and socially just, at the individual-level sustainable entrepreneurship in practice is still contextually situated within an opportunity landscape that has been shaped by market-oriented policy-making that rewards fossil fuelled industrially-intensive development over renewably fuelled ecologically sensitive development.

In the context of entrepreneurship, climate change has been called a social justice issue (Muñoz & Cohen 2018; Kaesehage & Leyshon et al., 2019; Greco 2020). From 1850-2021 the bulk of atmospheric and environmental destruction carried out worldwide has been wrought by only a small number of mostly-advanced economies, with the United States, China, Russia, and Brazil responsible for over 80 percent of the total damage (Carbon Brief 2022). Meanwhile the least developed countries of the world stand to suffer the most from an increase in global average temperatures, and extreme weather events such as severe droughts, floods and wildfires that are forecasted by the IPCC to worsen significantly over the coming decades (IPCC, 2022). These countries characterized by their endemic poverty, lack of human resources and economic vulnerability are already beset by significant state/market and human security challenges. At the time of writing many of them such as Afghanistan, Central African Republic, the Democratic Republic of Congo, Sudan and South Sudan, Eritrea and Ethiopia are mired in armed conflict. Climate change stands to act as a force multiplier compounding a variety of locally specific, complex security dilemmas (Carter Center 2022). As the force multiplier of climate change exacerbates existing tensions, this could in turn lead to an increase in mass migration. According to the World Bank (2021) climate change could force 216 million people across six global regions to move within their countries by 2050. In addition to climate change there is the related matter of energy access, which can also be framed as a social justice issue.

UN Sustainable Development Goal 7 seeks to guarantee sustainable energy access to all citizens. Globally, the number of people without access to electricity was 759 million in 2019. Despite significant progress made, current forecasts by the World Bank suggest that up to 660 million people could still lack access to electricity in 2030, with most residing in Sub-Saharan Africa (World Bank 2021). Without access, families are unable to devote time to productivity and leisure activities. Affordable access to electricity is also fundamentally a human rights issue, given that sanitation, healthcare, education, transportation, and information services all depend upon reliable, secure electrical infrastructure to meet basic modern needs. As someone who has been immersed in climate change research, RE solutions, especially distributed RE solutions, and off-grid and mini-grid solutions, have had always appealed to me as a multifaceted solution with potential to address the energy trilemma in a socially just manner. They offer economically attractive and socially beneficial returns on investment to policy-makers and private sector capital providers.
They address climate change by displacing GHG emissions from fossil fuel sources and offer an abundantly available, and financially sound alternative.

In attempting to separate economic from political factors of analysis, efforts to establish sustainable forms of entrepreneurship as a distinct field of research have, in a sense, attempted to rewrite history. The progression of environmental norms that have over time become commercial regulations, including those policy incentives that support entrepreneurial action aimed at advancing environmental goals, have their genesis in radical past action (Scholte 2000; Harvey 2007; Gibbs 2009; Tilley & Parrish 2009; Muñoz & Cohen 2018; Rosário, Raimundo & Cruz 2022). While there may not always be direct interaction between activists and environmental entrepreneurs, ecological entrepreneurs, and/or sustainable entrepreneurs the historical influence of the former upon all the latter is instructive. In the Scottish context, my findings show an ongoing symbiosis between environmental activism and sustainable venture creation at work on both individual and state/market levels. As Robert W. Cox asserts, “Theory is always for someone, for some purpose (Cox & Schechter 2002).” If it is human nature to wield theory for a desired end, then a just end is preferable to an unjust one. Reflexive autoethnography is a tool that can enable researchers to self-examine and uncover the history of ideas underlying their thoughts and actions, as well as the cultural concepts, narratives and ideologies that constitute privilege in their time and place (Gramsci & Buttigieg 1975). This in and of itself, the method of self-reflexivity, and identifying and critically examining how positionality influences one’s choice of research topic and one’s relationship to research is itself an ethical act (Winter 1989; Ellis & Adams 2011). In direction contrast to neoliberal orthodoxy, critical political economists seek a just epistemology, which encourages empathy and understanding extending beyond the realm of the personal to embody the existential, the quintessentially human, the relational. While I’ve not been an unquestioning, perfect proponent and advocate of this approach, I have conceptually embraced it throughout my research and am immersed in a reflexive autoethnographic project here that began with my entry into doctoral-level study at the University of Edinburgh back in 2009.

Set within the discourse on climate change, this PhD thesis aims first to address the critical political economy gap in the literature gap and uncover new insights into the individual motivations, contexts, and structural factors that shape and define the practice of sustainable entrepreneurship a posteriori. I aim to demonstrate through a reflexive examination of personal case studies that the phenomenon of sustainable venture creation cannot be explained by market factors alone and that political economic factors constitute additional drivers not previously addressed in the literature. My contribution to the literature is to show how critical political economy can broaden our understanding of sustainable entrepreneurship in practice, as sustainable entrepreneurs pursue new venture creation as a catalyst to transform states/markets on a mission to solve the climate crisis (Baumol 1990; Schaltegger & Ludeke-Freund 2016; Muñoz & Cohen 2018; Murnieks, Klotz & Shepherd 2020). Within the field of entrepreneurship, sustainable entrepreneurs thus comprise a distinct sub-culture of actors operating in a dynamic, pluralistic landscape where influential individuals and organizations compete and cooperate to advance their own
goals according to their diverse value systems. Drawing on themes of environmentalism and progressivism, my reflexive analysis of the three cases I present below offers some compelling evidence to show how the style of creative destruction championed by political economists of old may ultimately lead to self-destruction, thus constituting a dangerous mythology that the lone individual entrepreneur can transform society for the better without consideration for the environmental and social costs of their choice of business model.

1.2. Purpose and aims of the research

The primary aims of this research are threefold: (i) to develop a critical analytical framework that can be used by practitioners and researchers to capture and analyze primary data extracted from the process of sustainable venture creation more effectively given the time and resource constraints inherent to the practice of sustainable entrepreneurship (ii) for the three case studies and analysis I present to contribute to the evolving body of case studies about sustainable entrepreneurship for use in gaining new understanding (iii) to make a novel contribution to existing academic research in the field of entrepreneurship that includes new insights into how political economic factors shape the practice of sustainable entrepreneurship.

This PhD thesis has set out to capture and analyze, through the use of reflexive autoethnography, the experiences, and challenges I have faced as a sustainable entrepreneur. It seeks to shed light on the political economic context of Scotland from 2009-2019 and to identify those political economic drivers and barriers that formed the operating context of the three sustainable ventures studied. By employing reflexive autoethnography with a case study approach, I present a methodological innovation that may assist researchers in their efforts to access hard-to-reach data and gain deeper insight into the practice of sustainable venture creation, including motivations and structural factors at both individual and state/market-levels of analysis. This methodology may also be used by researchers who are close to or leading the creation of sustainable solutions in the collective struggle to address the climate crisis that we all face.

This PhD thesis is guided by three primary research questions:

(i) How and in what ways do sustainable entrepreneurs go about creating sustainable ventures? What sort of processes do they follow?

(ii) What individual factors motivate sustainable entrepreneurs to create sustainable ventures? What about state/market factors?

(iii) How do these individual and state/market factors influence the process of sustainable venture creation? Do they help or hinder the process?
1.3. Thesis structure: a portfolio of papers

This PhD thesis follows a portfolio of papers format. This format requires PhD students to submit a thesis that comprises three papers that cohere theoretically and/or empirically. In addition to the three papers, there must be substantive introductory and concluding chapters. The introduction should provide, as a minimum, detailed outlines of the theoretical and empirical motivations for the project, comprehensive analyses of the context, and an outline of, and justification for, the methodological approach taken. The conclusion should provide a substantive overview of the project that reflects on the commonalities across the papers, key theoretical, empirical and methodological contributions, potential limitations, and suggestions for further research.

The three papers included here are the case study Chapters 3, 4 and 5. Chapter 3 has already been published as a book chapter. Chapter 4 is under consideration for a conference presentation in early March 2023 and Chapter 5 is in development for submission to a peer-reviewed journal. While the contents of these chapters have been adapted to meet the requirements of this PhD thesis following the above portfolio of papers format, they also exist outside this PhD thesis as stand-alone papers. A brief note on the state of publication and access permissions for each paper is included at the start of the three case study chapters below. Each of the three case study chapters then begin with a personal, individual-level autoethnographic description detailing my circumstances, reflections and background relevant to the creation of that venture, followed by a description of the state/market context that shaped the opportunity landscape in which I led the venture.

This PhD thesis is comprised of eight chapters:

Chapter 1, Introduction, provides a brief overview of the purpose and aims of the research accompanied by a chapter-by-chapter outline of this PhD thesis and a comprehensive review of the literature on sustainable entrepreneurship, as well as gaps.

Chapter 2, Methodological Framework, introduces the reflexive autoethnographic method with case study approach that I develop in this PhD thesis. I argue that reflexive autoethnography is valid to research and writing that aims to describe and systematically analyze (graphy) personal experience (auto) in order to understand cultural experience (ethno). Autoethnographic research challenges more orthodox ways of conducting research and treats research as a socially-just and socially conscious act. The reflexive autoethnographic method with case study approach is a tool that can be used to capture empirical data about the underlying processes and drivers that shape the practice of entrepreneurship for use in comparative analysis. When the data is viewed from a critical political economy perspective, new insights concerning ideological and power dynamics at the individual- and state/market-level emerge, shedding new light on the challenges sustainable entrepreneurs must face.
Chapter 3, Case Study I: Scottish Global Relations Forum (SGRF). In this chapter I describe and examine the first sustainable venture I founded and led. The SGRF was a multi-stakeholder initiative, designed to capitalize on a perceived market demand for mediation services targeting both public and private sector clients involved in energy and state security sectors. Led by a consortium of Edinburgh-based thought leaders, the purpose of the SGRF was to “transform the way international stakeholders: share ideas, identify underlying interests and agree action plans for delivering solutions to climate and security challenges.” The organization was initially supported by grant funding and office space by the newly formed Edinburgh Centre for Climate Innovation (ECCI), an incubation lab and events space housed on the University of Edinburgh campus in High School Yards.

Chapter 4, Case Study II: Sustainable Community Energy Network (SCENE). In this chapter I describe and examine the second sustainable venture I founded and led. SCENE was a social enterprise designed to help local community organizations in Scotland secure economic, social and environmental benefits from renewable energy ownership. The organization was initially supported by grant funding and office space from the ECCI. SCENE was the first ECCI start-up to receive such support. Its flagship product was a technology platform, ‘SCENE Connect,’ designed to enable local organizations to share case studies of successful local ventures.

Chapter 5, Case Study III: Cost of Interconnection Prediction Algorithm (CIPA). In this chapter I describe and examine the third sustainable venture I founded and led. In cooperation with academic colleagues at the University of Edinburgh School of Engineering, CIPA was the results of an Innovate UK funded effort to develop an algorithmic software tool to help renewable energy planners, developers and cabling engineers accelerate least-cost path scenario modelling for new grid-connected power plants in Scotland.

Chapter 6, Cross-case Analysis and Synthesis, in the chapter I employ a thematic analysis that interweaves each of the three cases studies in a coherent synthesis. Viewed through the theoretical lens of critical political economy, I reflexively assess the underlying individual and state/market tensions inherent in the sustainable venture creation process drawing out new insights that can be used to inform theory and practice.

Chapter 7, Discussion and Implications, in this chapter I explore the implications derived from the cross-case analysis and discuss the limitations of the approach with recommendations for further research.

Chapter 8, Conclusion, in this chapter I provide some final thoughts on the critical political economy of sustainable entrepreneurship.
2. Chapter 2: Methodological Framework

2.1. Introduction

There are multiple advantages that the method of reflexive autoethnography creates for sustainable entrepreneurship research, particularly concerning the process of new venture creation and the various complexities involved. In this chapter I introduce a case study approach (Yin 2003; Došek 2020), to allow for greater ease of transferability and comparative analysis. Reflexive autoethnography brings the reader closer to the subculture studied through the experiences of the author, while helping to contextualize and situate the data extracted from each case for ease of drawing comparisons between cases in a manner available to other researchers and practitioners (Ellis & Adams 2011; Adams, Ellis & Jones 2017). Artifacts compiled from my company and personal records consist of materials rich with empirical data that evidences the process of each new venture creation to completion. Data is structured using a business case study approach (Yin 2003; Došek 2020). While every practice has its own unique culture and environment, the introspection and evaluation provided by the methodology of autoethnography greatly facilitates an understanding of the processes of new venture creation with implications for the context in which the process is situated (Johannisson 2002; Steyaert 2011).

The experiences I have encountered, the problems I faced, and the interpretations derived from the analysis strengthen my own practice as an entrepreneur and provide new insights into the dynamic challenges which entrepreneurs and practitioners face owed to climate change. Data gathering has consisted of compiling Agendas and Notes of Meetings (NoMs), Events and Workshops materials, Business Plans, Marketing materials, Investment Prospectuses, Funding Applications, Investment Memoranda, Pitch Decks, Company Records, Notes of Conversations (NoCs) and Signed Agreements with partners and stakeholders from my archives. Data extraction and theme selection has been informed by the research questions and theoretical framework.

Analysis is through a critical political economy lens. Key attributes of the data are structured by a business case study approach and accompanied by reflexive analyzes on wider theoretical (i.e., political economic) implications, serving to make a novel contribution to academic research in the field of sustainable entrepreneurship. In the tradition of business and management studies, as well as studies of entrepreneurship, a conventional case study approach is applied to capture and frame the entrepreneurial process in a manner that allows for ease of drawing out deep insights (both personal and professional) that enables comparisons to be made between each case and analyzed in relation to the critique of other’s approaches.

It is important to draw a clear distinction between the telling of an autobiographical story and a story that is both reflective about the situation and also positioned within discussions about that situation. Not all writing about personal experience is autoethnographic. There are additional factors that distinguish autoethnography from other kinds of personal work. These include (1) purposefully commenting on or
critiquing culture and cultural practices, (2) making academic research contributions, (3) sharing personal insights purposefully, and (4) creating a two-way relationship with target audiences to compel a response (Holman, Jones & Adams, et al. 2013).

Since it can sometimes be difficult to differentiate between an autoethnography and an autobiography, personal experience should be critically analyzed in the context of cultural practices. The necessity to contribute to academic research situates the autoethnography within scholarly discussions relating to that theme, which is the core differentiating factor (Holman, Jones & Adams, et al., 2013). Autoethnography thus creates an opportunity to express ideas and share insights which do not fit within traditional social science research, to offer deep and rich descriptions, handle difficult situations, critique surface attitudes, and ultimately bring to light hidden issues. Autoethnography engages multiple audiences and provides access to data that would ordinarily be off-limits to others (Chang 2013).

2.2. Literature Review: What is Autoethnography?

While social science broadly aims to explore questions pertaining to prevailing phenomena within society, the crucial challenge faced by social science researchers is in the collection of empirical data and in the robustness of methods used for analysis of that data used to answer the research question/s (Fletcher 2011). Given that individual perception is influenced by external stimuli and internal mental processes, we are limited in our capacity for objective analysis of social and/or cultural phenomena. Social science researchers must therefore deal with this limited capacity for objectivity and to address it whether adopting qualitative or quantitative research methods or mixed methods. The selection of a research method to collect and analyze data, is always made from a particular perspective. That is to say that the choice of a research method to study social phenomena is fundamentally influenced by ones’ own biases, irrespective of whether the data is qualitative or quantitative in nature (Duncan & Fellow 2004). This matter of objectivity in research method selection exists in addition to practical considerations (Hanyes 2011).

Quantitative methods used in the investigation of social phenomena can produce repeatable measurements and mathematical, statistical, and numerical data for other researchers to use in their own analyses. This resemblance to natural science methods is useful when data collection can take place on a wide scale, involving sample sets that can accurately represent and model widespread social activity. For the investigation of social phenomena where the object of the research is individuals and/or social groups and the subject of the research is their decision-making, motivations, experiences, and processes, the availability of data on a wide scale is scarce. However, in such cases the availability of data may have considerable depth and therefore, a research method suitable to capturing and modelling this depth is needed (Brigg & Bleiker 2010). While data collection in such research settings is limited by range and scope, the considerable depth of data if captured does indeed enable new insights and generates valuable new knowledge. This has been acknowledged by communities of researchers and practitioners who advocate the use of autoethnographic methods where the researcher is close to the subject under
investigation, and where the researchers’ own impressions and biases are inseparable from the research as is the case with this PhD thesis (Haynes 2011; Fletcher 2011). Generally, this acknowledgement by social science researchers that the researcher’s own experience of conducting research is an unavoidable subject of the research itself is known as reflexivity. Reflexivity is an approach to social science research where the researcher reflects and comments on their own subjective reality as it pertains to the research process. However, it should be acknowledged that choosing a methodology can never be a purely objective process irrespective of whether the sample set is large or small.

Autoethnography is a form of qualitative research in which the researcher utilizes writing and self-reflection for exploring personal and anecdotal experiences while connecting this autobiographical story to wider political, cultural, and social understandings and meanings (Brigg & Bleiker 2010). Atkinson & Coffey, et al. (2000) have defined this method as a way of doing research in which researchers use personal experience for the investigation of social phenomena. Intrinsically, autoethnography is grounded in the theory of postmodernism and situated within the broader academic debate regarding voice and reflexivity in social science research (Fletcher 2006; 2011). Autoethnography gives due attention to its use of experimental and subjective strategies while discussing the theoretical and epistemological framework of autoethnography itself.

Autoethnography as a robust method of inquiry has three distinct forms. The first form of autoethnography is the style of writing an autobiography. Several researchers have used biographical autoethnography in their research studies for evaluating the dichotomies between self and other (Bruyat & Julien 2001; Brigg & Bleiker 2010). The second form of autoethnography that is commonly adopted in social research is the anthropological form of autoethnography entailing ethnographic autobiography and autobiographical ethnography (Ellis & Bochner 1996; Adams, Ellis & Jones 2017). The third form, widely adopted in the literature of social sciences, is drawn from literary theory. This third form is known as autoethnographic sensibility.

2.2.1. Biographical autoethnography

Biographical autoethnography is one of the most common forms of autoethnographic research in social science, used when the personal experience of the researcher is the subject of the research, and the researcher is considered an exemplar of the social phenomenon under analysis (Haynes 2011). Wolcott (1999) states that biographical autoethnography is both evocative as well as analytical. John Van Maanen (1995) describes biographical autoethnography as a means of confession whereby the researcher begins to tell life stories as an entry point for self-analysis. The method may also be used to enable data capture and analysis from which other researchers can derive their conclusions about wider social phenomena or societal relations in which the subject has been situated contextually (Wall 2006; 2008). Biographical autoethnography is highly personal and highly subjective, raising questions about repeatability and reliability. According to Haynes (2011), life stories are a powerful means for the researcher to connect their personal experience to
societal interactions. Specifically, when addressing themes of oppression or systemic subjugation, whereby the researcher has suffered some sort of political or cultural repression, biographical autoethnography may be one of the only means of data capture for use in academic research. For example, understated expressions of indigenous, postcolonial, and LGBTQ scholars can be brought to light through use of this form of autoethnography, generating new knowledge and insights from previously unavailable or ignored experiences and liberating the scholars themselves from their oppressed condition.

2.2.2. Anthropological autoethnography

The second form of autoethnography is anthropological autoethnography (Leitch, Hill & Harrison 2010). Here the researcher or ethnographer instrumentalizes narrative writing about their experience in a reflexive, contextually situated position as part of the research process. Leitch, Hill and Harrison (2010) state that anthropological autoethnography entails multiple types of conceptualizations, encapsulating numerous perspectives and drawing upon a wide range of data sources. Readers of anthropological autoethnographic research may get the impression of reading a novel composed in the first person, whereby the author adopted an assessment of their own rooted experience in the research. The outcome of the research is an ethnographic representation of a lived experience carrying out research, containing reflections on both the social phenomenon under study alongside that of the researcher’s own personal reflections and accounts. When employing such a method, the researcher essentially blends ethnographical and autobiographical data which blurs the ethnographer’s authorial space.

2.2.3. Autoethnographic sensibility

Autoethnographic sensibility is a third form adopted by autoethnographers where use of first-person narrative is undertaken in a similar manner to that of biographical autoethnography, but where in this case the researcher is non-Western, addressing a Western audience. According to Wall (2008) this method is a variant of autoethnography which is produced in a form that is different from ones’ own. Autoethnographic sensibility differs from the more conventional, Western biographical autoethnographic first-person narrative, where in this case the researcher adopts a stylistic form of communicating with others, rather than the vernacular form. For researchers who are either Western-trained or Western-located, it is a form of writing meant for research but not for their reproduction. However, according to Leitch, Hill and Harrison (2010) researchers who are non-indigenous can engage in the interpretation of autoethnography by means of cultivating an autoethnographic sensibility toward the research; that is to say a reflexive understanding of ones’ biases that are specifically related to the condition of being Western. The reliance of autoethnographic sensibility is upon recognizing that the subject of the research is being represented idiomatically through the autoethnography (either performative or textual), engaging in a dialogue with those who would represent them in their research.
2.3. Advantages and limitations of autoethnography

According to the literature, combining fields of research is one of the major advantages of autoethnography. Autoethnography gives readers uniquely rich access to the private world of the researcher (Chang 2013). In Leitch, Hill and Harrison (2010), such an advantage of data access positions autoethnography powerfully irrespective of research field, because of the fact that the researcher calls upon their deep experiences and treats those experiences as a data source from wherein the particular phenomenon is being investigated and explored. Chang (2013) states that the depth of data is perhaps the foremost compelling reason for the employment of autoethnography as a research method, especially in situations where practitioners are leading the research and are thus time- and resource-constrained. The methodological toolkit of autoethnography equips the practitioner researcher with a robust framework for data collection, data extraction and data analysis that can, because of its unique depth, give rise to insights that would ordinarily be considered out of reach to researchers who are either not practitioners or relying on other research methods.

One could simultaneously argue that this main advantage of autoethnography—allowing rich data collection—could also be regarded as a limitation due to the reliance on personal narrative to extract it. With a tendency toward storytelling, as opposed to more traditional modes of composition, autoethnography differs from composition styles traditionally regarded as being more appropriate to facilitate objective analysis. Considering Ellis and Bochner (1996), such an objection is itself a misunderstanding of the world we inhabit as researchers and practitioners. The true nature of research is a production of self, and by extension a reproduction of culture. Research is an embedded cultural act. One cannot escape their cultural context. This reflexive positioning is not only widespread among champions of autoethnographic methods it is also theoretically supported by critical theorists in the tradition of critical political economy led by scholars who carry on in the tradition which started with Antonio Gramsci (1975). Robert W. Cox summarizes the critical political economy position toward reflexivity in research as, “Theory is always for someone, and for some purpose” (Cox & Schechter 2002). This position aligns with Ellis and Bochner’s (1996) assertion that research as an experience of self, is always a cultural act, and one that cannot exist outside the bounds of or separate to one’s cultural experience. The epistemological position thus begins with the inseparability of self and the object of research in social science and concludes that the responsibility of the researcher is therefore to address and disclose their own biases reflexively and with sufficient effort and attention paid to how the research may equip or erode power imbalances inherent to and historical in the human experience.

Ellis and Bochner (1996) claim that autoethnographic research must have a practical or beneficial goal for all the involved parties. The nature of this practical aim of autoethnography can vary depending on the type of research involved, but there is always a goal of educating and informing readers about the research topic through the medium of personal experience. Regarding the use of autoethnography as the means of communicating research, Wall (2008) states that of critical importance is
the way in which the account of personal experience enables the reader to enter the subjective world of the researcher, and as a result to perceive that world through the researcher’s perspective, even if this world does not perfectly reflect reality. In the case of applied autoethnography to research new venture creation, the key advantage I have been afforded is in allowing accounts to be composed in the first person, thus enabling my voice to be heard more broadly both within and then beyond the boundaries of this PhD thesis that I am immersed in. Consequently, autoethnography creates an opportunity for the entrepreneur address any subject area which they may perceive as oppressive, unjust and/or in the case of this thesis, existentially-threatening. Richardson (1994; 2000) claims that autoethnography is an emancipatory discourse enabling those who are being emancipated to represent themselves, rather than being subject to the controlling forces of others and/or subjected to the agendas of oppressors and/or relegated to being disadvantaged on account of some inherent bias against race, religion, nationality, sexuality, or gender identity. Thus, for practitioner researchers, autoethnography offers an opportunity to speak truth to powerful forces within and beyond academic and practitioner communities—both personal truth and universal truth—without relying on the same power levers used by the powerful to dispossess them (Richardson 1994; 2000).

2.4. Ethical considerations

A major characteristic of autoethnography is that it is focused on the self, and as a result may create a tendency in the researcher’s interactions with others for those interactions to be overlooked and unevaluated. Context and interaction with the stakeholders who are part of the research is an important consideration of reflexive autoethnography, when possible as the researcher’s personal point-of-view is being developed (Adams, Ellis & Jones 2017). The question of either obtaining or not obtaining consent to share data and to share insights through analysis that, in the latter case may go unquestioned or unchallenged by those stakeholders with whom the researcher has interacted, must be dealt with here. Particularly evocative autoethnographic writing may be associated with the detailed information of periods of the researcher’s life that may involve sensitive interpersonal issues related to the researcher and their stakeholder community (Wall 2006; 2008). Precautions needn’t be limited to the stakeholder community in question but should also be taken when the researcher’s loved ones, friends, or family members are referred to.

To resolve this, the researcher has a few choices. The researcher may for example, employ the third person narrative in writing about interpersonal events and in interpreting those events so that the focus of the event in question may focus more on the events under analysis, rather than on the emotions conveyed through self-analysis. For some autoethnographic researchers, use of third person may give them a sense of distance from the people and events under review (Ellis & Adams 2011; Adams, Ellis & Jones 2017). It may be the case, as it is often with this thesis, that the freedom to share emotional insights from the perspective of the self is unavailable either due to confidentiality agreements, out of respect for stakeholders’ privacy and/or if such disclosures could be considered libelous (Stake, Denzin & Lincoln 1994). In the case of this PhD thesis, all three considerations have been made to
protect the personal reputations of all stakeholders written about in the third person when composing the case studies and in providing the self-analysis, where I employ the first-person narrative.

For researchers who are not employing a case study approach, the first person may be the only option for being wholly explicit related to the event/s under analysis. This can in turn limit the researcher’s options for sharing relevant information that may cross ethnical boundaries when recounting interpersonal experiences. Wyatt (2008) argues for a first and a second ethnical principle when carrying out autoethnographic research. The first principle is to consider how close to position the reader to the stakeholders being analyzed and discussed in the research. Will the research cause personal or professional harm? Giving due consideration to the professional reputations and professional sensitivities of stakeholders, in addition to considering contractual and legal implications of confidentiality and signed agreements, is advisable so that any infringements can be minimized. The second ethnical principle to consider is that of consent. However, when writing about critical periods that have taken place and are instrumental to the research, it may be impractical at least, or at most highly complicated and resource intensive to seek and get signed consent forms prior to involving stakeholders in a publication. Furthermore, doing so may not aid the research, if for example, the researcher is only addressing through the first person, accounts of interpersonal experiences where they are not disclosing any confidential information or information that may violate the first principle (Wall 2006; 2008). The autoethnographic researcher also has the option to anonymize or obfuscate identities by way of an alias used to hide the identity of a particular stakeholder so that a critical interpersonal experience can still be recounted and analyzed at little or no risk to the stakeholder at question of being harmed. Of course, in the case of employing an alias or multiple aliases, the researcher must be cautious not to affect the underlying data, and thus risk rendering that data unusable or skewed to the point of unreliability (Wall 2006; 2008). Where certain subjects are concerned, or certain research questions explored, some to-be-determined impact on stakeholders may be unavoidable according to Ellis, Adams and Bouchner (2011) who claim that ultimately there are no definitive rules or universal principles that can inform autoethnographic researchers about what to do in every situation or relationship that they may encounter, other than the vague and generic principle to cause no harm.

Even though there are a variety of ethical issues to-be-considered when undertaking autoethnographic research, I concur with Ellis, Adams and Bouchner (2011) that the practice of autoethnography itself is an ethical one. This is supported by the aim of reflexive autoethnography to liberate the researcher from oppressive forces and the aim to have a positive influence on other researchers through the recounting of personal lessons learned. Furthermore, the embrace of self-analysis requiring disclosure on and dissection of one’s own subjective biases requires a degree of honesty that is often absent from research which portends to be subjective. To write a reflexive autoethnographic account entails being honest and ethical related to the events that are described. Furthermore, the addition of a case study approach, adapted from business and management research practice, provides a proven
framework for selecting which contexts are appropriate for sharing data for use in analysis. The accompaniment of a personal background with first person narrative, can give researchers a sense of time, place, and space that comprise the circumstances in which the author is situated, disclosing in plain view what biases that researcher may hold in respect of their positionality for anyone to critique and creating an opportunity for reflexive engagement with these subjects.

I should specify that while not all confidentiality agreements signed within the scope of this study remain in force, I have taken a cautious approach to determining what information can be disclosed in regard to the actions of others who have been involved at various stages in the sustainable venture creation processes described in each of the three case studies below. While the main thrust of the research is to reflexively examine my own actions, from my own perspective, I have deliberately excluded mention of any experiences, encounters or interactions with individuals that could be considered a violation of a Non-Disclosure Agreement (NDA). Non-Disclosure Agreements are common to the practice of new venture creation and are typically signed between parties in cases where any information that is being shared could be considered proprietary and confidential. Many Non-Disclosure Agreements remain in force for years after they are signed and can still be considered in some cases to have force even after the termination date set for the agreement has lapsed. I have followed best practices in the selection of what information to include in this research by erring on the side of caution when it comes to interpreting the reach and coverage of a Non-Disclosure Agreement and ensuring that the information provided, where not exclusively related to my personal experiences and actions, is already available in the public domain.

2.5. Criticisms of autoethnography

Duncan and Fellow (2004) state that the emergence of autoethnography and narratives of self has not been without pitfalls and suggest that the status of autoethnography as a robust academic research method remains problematic. The criticism which is the most recurrent for autoethnography is often on the strong focus on the self as the object of the research. Hence, autoethnographic researchers are often criticized for being narcissistic, self-indulgent, aloof and in producing research that is too subjective to be repeatable or useful to other academic researchers or to communities of practice.

Another criticism that has been levied at autoethnographic methods concerns the use of personal narrative as a means for data extraction. Walford (2004) is direct in the assertion that autoethnography is indistinguishable from fiction and should therefore not account for research. However, I have found such an assertion unconvincing in regard to entrepreneurship research, where case studies often heavily rely on first person testimony from those involved directly in the process. Such information may always contain bias, as with any other form of research. However, bias can be a further topic of research if the subject is willing to provide some reflexive commentary on their positionality and motivations as I have done here. Furthermore, Walford does not object to survey data as a reliable form of data collection, even
though survey responses have often been shown to provide spurious and at times even false results. In my view it is not the method of autoethnography that may produce unreliable data, but rather the degree of reflexive self-analysis and fully honest disclosure of the aims and objectives of the researcher that warrants scrutiny.

Ellis and Bochner (1996), conceive of autoethnography as always being a story about the past and therefore, not a like-for-like representation of the past itself. Of course, all history could be viewed as such and therefore, the debate mainly depends on one’s epistemological views concerning the proper place of reflexivity in its application to certain forms of social science research. For Ellis and Bochner (1996), the recreation of the past in the ways which are narrative, represent an existential project to progress in one’s personal life. The subjectivity of the researcher is the most valuable piece of the autoethnography, providing data richness not otherwise accessible to other research methods. They advise that a useful aim for personal narratives is to allow another person’s world of experience to inspire critical reflection upon one’s own. Hence, the goal of the autoethnography is the recreation of the experience of the researcher, which is reflective and is aimed at the creation of connection with the reader that could assist the reader with their own life project.

Walford (2004) counters that autoethnography is therefore therapeutic rather than analytic. Social science must be aimed at the presentation of logical and organized claims that have been supported by verifiable, empirical data. Walford’s point about verifiability raises a more compelling concern in my view. Indeed, how can the data recounted from personal experience be verified, particularly when the stakeholders discussed in the research have not participated in the writing of the research? My aim in adding the case study approach to framing and analyzing data, accompanied by narrative that is limited to the background relevant in each case is to create a harmonious balance between insight and verifiability that allows for the transfer of the approach to other practitioner researchers who may be sitting on significant, valuable data, but do not have a suitable, effective method of sharing it and may also have to contend with serious issues of confidentiality and legality in order to do so. To conclude on that point, before turning to the question of verifiability, Stake (1994) claims that objective reality can never be captured. We have only our own subjective experience to draw upon when we interpret the world. We can only interpret and communicate our experience of the world by means of representations in language and symbols. The data richness inherent to the method of autoethnography, particularly where reflexivity is applied, lies in the realities which emerge from the interaction which is made between the person and their own experiences which reflect the social and the cultural context in which events have taken place.

2.6. Evaluation of autoethnography and data validation

The challenge of evaluation of qualitative research and of data validation is of particular concern for practitioners who are undertaking research often part-time, in conditions of time and resource scarcity. The autoethnographic researcher is operating according to a newly defined and still evolving roadmap where there is a great deal of debate about what does and does not constitute robust data. There is
no evident consensus within the research community on this topic. According to Richardson (1994; 2000), this lack of consensus relates more to method than to theory, where the consensus on the nature of thought and being is largely consistent.

To help with methodological robustness and data validation or ease of sharing data for external validation, Medford (2006) suggests that the criteria for self-evaluation through reflexive autoethnographic analysis must be consistent firstly, and secondly must proceed from a genuine effort to capture and share data that is verifiably relevant for answering the research question. As there is no consensus on the specific criteria for the evaluation of autoethnographic research, and what is being presented as truth might consist of changes or omissions due to confidentiality and the principle not to cause harm, Medford (2006) proposes that evaluating the robustness of autoethnographic research methods ought to be guided by an ethic of accountability whereby the work must be disseminated to the communities of practice who are included in the research after publication. Indeed, this is the approach that I will follow if the this PhD thesis is accepted for publication. I agree with Medford (2006) that autoethnographic researchers must be willing to accept that subjects might disagree with representations made of them through the recounting of personal experience. Others may indeed question the autoethnographic researcher’s decision to write about an experience in the first place, but nevertheless that researcher ought to be willing to confront these issues, through direct engagement with those mentioned in the research by disseminating outputs and seeking feedback following publication.

Richardson (1994; 2000) claims that autoethnography must be evaluated as part art and part science and has proposed five criteria against which autoethnographic research can be evaluated. These are: substantive contribution, reflexivity, aesthetic merit, the impact of narratives on readers, and the amount of reality that is presented by the narrative. It is essential to note that these criteria refer to all types of ethnography including autoethnography, so it may be the case that some of the criteria that are proposed needn’t be applied to autoethnographic research that takes a fundamentally different pathway from ethnographic research. According to Chang (2013), the legitimacy of autoethnographic research and the credibility of autoethnographic research are expected to be addressed within the body of the research in each case, as a mode of perpetual defense. Chang emphasizes coupling third person narrative with first person narrative to create an identifiable separation between contextual analysis and self-analysis, such is the approach applied here.

I concur with Medford on the need to disseminate research work to communities of practice, insofar as the researcher has the time and available resources to do so. One of the main research aims of this thesis and the methodological framework presented is to enable practitioners to gain access to detailed information that can help to support their efforts to further, for example, policy-making in Scotland that is designed to aid sustainable venture creation. However, I have opted to disseminate the work only after it has been evaluated and critiqued by a board of examiners, as a practical consideration. Indeed, engagement with Scottish government policy-makers, and others in the field can be significantly time consuming and may distract
from the writing up process. The method I employ is a self-examination, in the form of a reflexive autoethnography, and does not focus on the motivations and aims of others, who were not themselves driving forward the process of new venture creation in a founding capacity. Granted, subsequent to the presumed publication of this thesis, carrying out such interviews with third parties involved in the cases examined herein could make for compelling post-doctoral research and collaboration and also confirm or challenge the views presented here. I intend to follow up as discussed above with those who are featured in the case studies following publication.

Autoethnographic research has been criticized for its high-level of subjectivity, and lack of verifiability and replicability (Hayano 1979; Gergen 1991). The reflexive element, which seeks to provide a degree of objectivity on behalf of the researcher, helps to structure the approach so that new knowledge can be generated and studied (Maydell 2010; Chang 2013). However, the researcher is not freed from the bounds of their own subjectivity even when attempting to situate self-analysis and the new knowledge derived from reflecting on personal experience to academic research. As such there will always be, when it comes to reflexive self-analysis, a realm of the unknown in which the researcher operates, where the researcher’s own capacity to reflect and glean insights through self-analysis are limited by the contextual arena in which they operate. Put simply, the researcher cannot escape their own subjectivity, when it comes to self-analysis regardless of how much they engage with theory.

Disclosure of biases and a sympathy with the critics of reflexive autoethnography can help to at least offer an account of the limits of the approach, so that other researchers may have access to the underlying data and assumptions. There is also the compelling position, supported by a rich tradition of critical political economy scholars, that purports that all research is inherently subjective to one degree or another.

2.7. Reflexive autoethnography in entrepreneurship research

Entrepreneurship is a unique practice because of its potential to achieve extraordinary outcomes in the pursuit of solving complex problems, often against the odds. Entrepreneurial processes and practices, if successful, can generate substantial impact in and beyond the political economic context or geographical environment where they reside (Steyaert 2011). Such results are achieved through experimentation in a world that is recognized as not being safe, risky or certain. Instead, the world of new venture creation is considered ambiguous at best, nebulous, chaotic, and open to multiple interpretations (Johannisson 1995). To be able to exploit the potential of such circumstances, the entrepreneur must therefore mobilize all the human faculties at their disposal, including visionary capacities, in addition to cognitive abilities. To create order from chaos, innovative thinking is required. Additionally, it is important to recognize emotions as drivers of entrepreneurial action because they invite intuition, and it is crucial to acknowledge willfulness and passion as operative forces under circumstances where logic or experience can fail in their usefulness. To be an entrepreneur means anchoring a
professional practice in one’s own experience of self as an essentially existential project or way of being (Johannisson 2011).

At the same time while emotions are undoubtedly drivers of entrepreneurial action, they constitute a level of experience that is arguably even more difficult to ascertain than factual accounts of the actions and decisions taken throughout the course of venture creation. The case studies included in this PhD thesis have all been written about in retrospect to the events which they describe. Given the subtle, at times unavailable and often conflicting accounts of emotional experience that are the stuff of everyday life, I cannot with any degree of accuracy make a claim to know how I felt at times throughout the period described, without encountering additional feelings that I may or may not be experiencing now. While one of the main aims of this research is to divulge for analysis (both self-analysis and third party analysis) the content of my experiences, including my values and motivations, for use in furthering the development of new theories about the phenomenon of sustainable entrepreneurship, any attempt to include emotional factors in hindsight would almost certainly distract from rather than advance this aim.

2.7.1. Context in autoethnographic research of entrepreneurship

According to Johannisson (1995) context is important to entrepreneurship research for several reasons. Firstly, it is important to appreciate the empirical diversity and range of contexts in which entrepreneurial activity takes place (Johannisson 1994; 1998). Such complexity is made up of a mix of personal and strategic interests, which combine to enable opportunity pathways that define the entrepreneurial venture itself (Baumol 1990; Johannisson 2002;). As such, the political economic context of entrepreneurial action becomes an arena of competition and cooperation or a range of independent and dependent variables for producing different structural, strategic, behavioural and resource combinations that shape the opportunities and constraints of company creation (Schumpeter 1942; Kirzner 1973, 1999; Baumol, 1990; Steyaert 2011). The question of what is, and what is not in the domain of entrepreneurial enquiry is therefore one of ongoing debate as the personal and professional circumstances of the entrepreneur are intimately intertwined. A focus on political economic context in entrepreneurship research is important because it enables discussion on the political economic reality that is implicit to all entrepreneurial activity (Strange 1996; Scholte 2000; Cox & Schechter 2002). Contextual interdependences that comprise the political economic reality of venture creation challenges the often one-sided, market-oriented view of entrepreneurship.

Different contextual understandings can propel entrepreneurship enquiry from being concerned with context as a purely empirical issue to generating discussions about the theoretical significance of agency and structure (Strange 1996; Cox & Schechter 2002). At a theoretical level, being contextually sensitive might mean comparing the insights from one political economic context to another in relation to particular frameworks of analysis. This is a particularly novel appreciation when it comes to drawing insights across comparative case studies for example that may require data collection from different periods of time or geographic locations, affording different
opportunities and inviting different constraints upon diverse actors or interest groups (Yin 2003). Or, in privileging context, researchers may discover greater explanatory methods that can be applied to multiple cases across locations and/or data captured from multiple case studies under more closely shared circumstances (Steyaert 2011). In understanding entrepreneurship as not independent of political economic context it becomes easier to explain agency and structure as fundamentally inseparable and interrelated. I refer to this as the ‘individual-state/market’ context in the case studies below. Furthermore, by using the autoethnographic method to capture personal interpretations of political economic circumstances and other more personally situated phenomena, it becomes possible to explore and capture in greater depth the interplay between individual and societal experience, with the personal experience of the entrepreneur occupying an equally relevant space (Steyaert & Hjorth 2003). Finally, connecting actions to contexts enables autoethnographic researchers to address the sort of methodological individualism that is critiqued above and to acknowledge the interrelationship of factors shaping entrepreneurial action (Steyaert 2007).

For Johannisson (1995; 2002) the method of autoethnography to study new venture creation is shaped by four evolving dilemmas in the pursuit of accurately conveying and capturing the experience of entrepreneurship. The first dilemma is how to capture the experiences of busy practitioners who, because they are too preoccupied with their daily tasks to share their knowledge often do not recognize the breadth of insight, they have gained from doing (Johannisson 2002). The second dilemma is how to capture and analyze the venture creation process from multiple simultaneous points of view of other actors and stakeholders involved. The third dilemma, which applies specifically to reflexive research, concerns how to make intelligible the way that human beings relate to their work, e.g., their responsibility for participating in society and overcoming societal problems at large (Steyaert 2011). The fourth dilemma is how to garner ethnographic insights of entrepreneurship that account for both local and global opportunities and constraints.

Bauman and Briggs (1990) have stated that the first problem of context in research enquiry is one related to what they term false objectivity. In selecting the context/s for analysis there is frequently an assumption that the entrepreneur’s own situation is unique. Thus, researchers can demonstrate the context by framing their findings through self-narration or they can include the contextual factors in order to validate their own preconceived ideas (Steyaert 2011). Therefore, demonstrating objectivity in the analysis and research record of one’s own entrepreneurial action becomes a major analytical obstacle because the researcher is essentially making choices about which contextual factors are important. When writing up research findings, therefore, it is the researcher who determines what is and isn’t valid (Bauman & Briggs 1990). It is assumed that there can be a known and finite list of contextual factors and the researcher can select from this array of potential contexts to objectify their findings. Also, this implies that all contexts have an equal chance of being selected and just as opportunities are uncovered on the basis of individual knowledge other contexts exist elsewhere waiting for the researcher to come along and select them (Steyaert 2011). The researcher then generates understandings from a preferred position,
which the researcher then modifies or clarifies as context (Bauman & Briggs 1990). In doing so, a level of objectivity is supposedly secured for the research. But the objectivity that is sometimes attributed to contextual analyses is accordingly a false one owed to the fact the researcher has full access to a range of contexts either known or unknown. Even when researchers draw attention to particular issues, this does not mean that context and its categories are arbitrarily available for selection (Steyaert 2011). Contexts are created through the authorial intentions of the researcher undertaking the autoethnographic study and therefore the reflexive role of the practitioner and/or researcher is frequently implied but not made explicit in the research (Johannisson 2002).

The privileging of the researcher’s own decisions about contexts gives rise to the second problem of context in research studies. For Johannisson, this is a problem of ‘whose context’ and relates to criticism about the lack of attention given to the shared ‘coordinates’ and ‘imaginations’ enacted by interacting individuals in the experience of venture creation (2002). The attraction of reflexive research is that it provides a means of understanding entrepreneurship as a mixture of the interrelated experiences, situations, thoughts, and actions of the entrepreneur. This means that the researcher’s aims, questions, motivations, theoretical assumptions and aspirations become central to the context of the venture and their personal experience becomes a key part of the reflexive investigation and analysis (Steyaert 2007; 2011). In the social sciences, this is acknowledged as the ‘reflexive turn’, which reconnects the subject with the enquirer of research (Ellis & Bochner 1996).

The advantage of reflexive autoethnographic research of entrepreneurship is that the selection biases that are inherent in the selection of which context are made explicit to the reader. But then the third dilemma arises as to ‘on what grounds’ should one entrepreneurial event be selected over another? Although, researchers often voice the need to address the social, economic, political and ethical contexts of their research, the researcher not only has multiple contexts to consider but also a variety of layers of contextualization (Steyaert 2011). There is, for example, the university context of their particular research program with the regulations of the particular funding body or statutory procedures outlining the funding, nature, timing and conventions of the research. There is also the institutional context of the topic being explored, e.g., academic, governmental. There is also the individual context of the researcher and that of those advising the researcher on their professional choices concerning career development matters such as the need to publish, prepare a conference paper, design a course, lecture, or obtain a PhD. Then there is the context of situation in which issues of gender, ethnicity, race, sexuality, or social status become meaningful. Indeed, other contexts could also be added, but what is clear is that there is a potentially endless array of relevant contexts. The ‘enactive’ approach to limiting contexts provides some useful instruction for limiting the number of relevant contexts.
2.7.2. The ‘enactive’ approach to reflexive autoethnography

In light of these dilemmas, how can we determine which contexts are to-be-included? To address this, Johannisson proposes a reflexive method of enquiry which he has called ‘enactive research’ which encourages a stronger sensitivity to context but with the entrepreneur providing a first person account of biases inherent in choosing which contexts are and are not relevant to the research. This method of enactive research has seven key features (Johannisson 2002; Steyaert 2011):

(i) First, enactive research sees reality as segmented. Segmentation means that reality is shared and imaginatively created by interacting individuals.

(ii) Second, it acknowledges the researcher’s preconceptions in the domain being researched.

(iii) Third, it requires that the entrepreneurial venture/s being studied should be tracked in relation to the biography of the researcher.

(iv) Fourth, this style of enquiry is about manifesting a new reality from the composite of the reflexive experience through self-inquiry.

(v) Fifth, the enactive approach is inclusive of all human capacities (e.g. emotional, sensory, aesthetic, thinking and feeling).

(vi) Sixth, enactive research does not aim at increased personal insight. Instead, the objective is to enhance understanding of a social phenomenon such as entrepreneurial process.

(vii) Finally, enactive research is concerned as much with the material and physical and whilst it has an interest in linguistic expressions, it is not linguistically reductionist

To summarize my position on the matter of contexts, I have employed theory to aid in case selection and presentation so that the critical political economy perspective can inform which enactive representations are relevant to the self-analysis component of framing each case study. Put simply, the political economic (state/market) factors of analysis that shaped the opportunity landscape for each new venture provide the frame for presenting each case. As both subject and object of the research, my experience of navigating the state/market dynamics which I have identified and the strategies I have employed help to define the boundary of what analysis is practically useful to other researchers and practitioners. The question of which, political economic (state/market) factors are relevant to each case, is based on a typical case study approach, enriched by the accompaniment of a reflexive self-analysis which describes how my personal political economic goals are met by a state/market reality that can either aid or inhibit efforts to create a new sustainable venture. The result is a methodological innovation that may be replicated by other would-be sustainable entrepreneurs who are limited in their ability to undertake
academic research while in the process of enacting a new venture on account of the practical constraints, which are inherent to the process.

2.8. Case study approach

Like autoethnography, case study selection is not an exact science. Firstly, the case study researcher is presented with a problem of representativeness, as limited time and resources and other practical concerns related to confidentiality and stakeholder positions must be accounted for. Such limits shape the agenda for case selection, which is then followed by an effort to capture relevant data that can inform the study. This means that case selection and case analysis are interrelated (Seawright & Gerring 2008). The primary aim of the case study approach employed in this thesis is to enable transferability of valid knowledge to others. Cases from my own portfolio of experience are selected for depth of analysis given the availability of significant troves of empirical data that would normally be off-limits to researchers. I have also chosen cases where the venture progressed to a stage of maturity that resulted in either an end product or service being created. Alternatively, I could have considered additional case studies where a new venture did not result in the creation of a new product or service, however the data available in these instances is far less and therefore, provides a far more limited scope for undertaking meaningful analysis. As a result, the analysis will not have the benefit of carrying out a large cross-case analysis. However, my intention is to build a framework beginning with a small sample of which I have some deep insider perspective and data access in order to extrapolate knowledge that will enable further study, for example to severe as a post-doctoral research project and/or a project in collaboration with fellow colleagues and researchers across a wider range of cases.

In the absence of a purely scientific approach to case selection, scholars continue to emphasize pragmatic considerations such as available financial resources and degrees of data access. Indeed, these considerations have heavily informed the current approach. Of course, these are perfectly legitimate factors in case selection, but they do not provide a methodological justification for why one case may be preferable to another. It is essential that limitations are accounted for, which is why the reflexive autoethnographic methodology has been chosen, as without it this could lead to results which do not transparently share the motivations and theoretical positioning that has influenced the cases that are being presented (Johanisson 2002; Steyaert 2011; Gerring & McDermott 2007).

Choosing good cases from extremely small samples is a challenging process (Yin 2003; Seawright & Gerring 2008), given that the aim of most case studies is to provide insights into the workings of a broader population. The case selection used in this study is therefore attempting to gain insights about something larger than the individual cases themselves, namely the strategies employed to address the problem of climate change, in its manifold manifestations and aspects of thinking, positionality, motivation, and personal circumstances as well as relationship to state/market context. Even if the resulting generalizations require further investigation, the initial study will enable these first cases to play a key role in developing the analytical
framework that can aid additional research for use in gaining more general knowledge (Gerring & McDermott 2007). It remains to be seen what generalizations can be made from the limited sample chosen and I intend to canvas the views of researchers and the stakeholders mentioned in the research following the publication of this thesis so that learnings can be disseminated, feedback gained from both researcher and practitioner communities, and the analytical framework can be further refined to meet their requirements. However, it is my hope that the combination of reflexive autoethnographic method with these three case studies that contain both first person (individual) and third person (state/market) analysis will be sufficient to serve the research aims.

2.8.1. Case study design

Case studies are a common form of research design and are widely used throughout the social sciences. Case studies enable researchers to focus on a single individual, group, community, event, policy or institution and study it in-depth and often over an extended period of time (Grbich 2012). This approach is closely associated with anthropology and has been applied to research examining various sub-cultures, tribes and institutions in the political sciences and business and management studies (Cassell & Cunliffe, et al. 2018). While both quantitative and qualitative data can be generated by case study design the approach has a more qualitative feel to it as it generates a wealth of data relating to one specific case. The data cannot be used to generalize about the population as a whole as the case study is unique and not a representative sample of the subject or group.

In designing a case study, the choice of a typical case does not always yield the most valuable or insightful information (Yin 2003). In the attempt to ascertain deeper knowledge and insights, it is therefore useful to select research subjects that offer an atypical or particularly revealing or compelling set of circumstances. A case selection that is based on representativeness will accordingly not be able to produce the same richness of insights as one that aims for uniqueness (Došek 2020). A ‘key case’ is therefore chosen either on account of the unique circumstances surrounding it or because the researcher, as is the situation here, has in-depth knowledge and data access. It is this latter aspect that has largely formed the approach to this study, for example in the context of climate change, empirical evidence from the experience of venture creation is a relatively new research area, and I am in a unique position to share access to an abundance of detail covering the breadth of my own experience and the depth of each venture presented as a case. Under unique circumstances such as this, when the researcher possesses this atypical degree data access, they are in a position to offer reasoned lines of explanation based on their unique experience of context and circumstances that can yield a new and rich contribution to academic research (Došek 2020).

Outline of a case study (Yin 2003).

I. Overview
   a. Background
b. Founding

c. Critical incidents

II. Structure

III. Growth

IV. Strategy

V. External environment
   a. Opportunities and threats
   b. Competition
   c. Bargaining

VI. Analysis

VII. Conclusion

2.9. Data collection and analysis

The advantage of using a case study approach to critically evaluate my experience as an entrepreneur is that it can, to some extent, help to ensure that the contextual dilemmas inherent to a reflexive autoethnographic methodology are balanced out by a more detached evaluation of the data. The need to step beyond oneself in self-analysis in order to generate new knowledge from each case is evident from the literature review. My use of case studies enables the capturing and presenting of data from my company and project, archives using the above design to instruct which events are key to enabling analysis. This approach can be applied in making comparisons and informing further research questions. Over the course of ten years spanning from 2009-2019, each case contains a series of rich artefacts stored on laptop and structured using a common file format that has been shaped by customary and sometimes statutory business practice for use in compliance with standard company procedures according to UK regulations. The records are disclosed in the resources and available for review, in some cases without need of gaining permission. Below is a sample of the file format containing artefacts that has been applied consistently for each case:

![Figure 1: Case study file format](image-url)

Each folder contains artefacts that are archived according to the time, date and (when relevant) participants or sub-sections of a project ID. For example, under the folder
titled, ‘Agendas & NoMs’ there are sub-categories containing inputs which are archived under the following headings:

![Figure 1.1: Case study archives](image)

Each artefact contains data captured from a specific moment in time from which insights about the wider new venture creation process, including evidence as to the effectiveness or lack thereof of approaches applied, can be derived. Each case study concludes with a reflexive analysis which offers a highly detailed description to accompany each event in the case study from an individual perspective with new knowledge being gained through the reflexive autoethnographic analysis at both individual- and state/market-level.

2.10. Thematic analysis

I use thematic analysis to identify the most interesting and representative patterns across the three case studies (Grbich 2012) and then synthesize the research findings. Thematic analysis aims to locate and capture the most common and relevant themes within the data, which are able to represent the whole dataset in the form of a thematic map of the process or phenomenon being investigated (Maydell 2010). With the aid of this technique, I have attempted to make my dataset more accessible for further research and more detailed analysis with the help of case study design.

My choice of thematic analysis for use this study was largely determined by the nature of the data, the primary features of which are artefacts of organizational management from my personal archives, while the analysis must also reflect the commercial sensitivity of the data, which may impede access by other researchers’ efforts to validate. For this reason, the analysis had to adhere to the fact not all of the materials could be relied upon for data extraction. Therefore, theme selection must be confined to my personal experience of sustainable venture creation and not the experiences
of others. Because of the oftentimes highly commercially sensitive qualities of the data, other analytical techniques such as content analysis or grounded theory, were not applicable to the data on the basis that both of these require a fragmentation of the data into initial codes, sometimes represented by only a few words (Maydell 2010). The disadvantages of using a grounded theory approach for this research is also that subjectivity of the data leads to difficulties in establishing reliability and validity of approaches and information. It is difficult to detect or to prevent researcher-induced bias (Grbich 2012). In terms of theme selection, critical political economy provides a lens through which expectations about the influence of political economic drivers can be formulated and used in exploring the data in each case.

Figure 1.2: Research design
Chapter 3: Case Study I: Scottish Global Relations Forum (SGRF) (2009-2010)

A stand-alone version of this first case study chapter has been published in Chapter 4 of Social Innovation and Sustainable Entrepreneurship: The Johns Hopkins University series on Entrepreneurship (Espinia & Phan, et al. 2018). The original edited draft is currently being made available in its original format as an Open Access monograph on the publisher’s website: https://www.e-elgar.com.

3.1. Background

For me the decision to start-up a new venture was less a conscious choice and was much more a social, ethical, creative, and intuitive process. It was especially non-linear. I did not begin with an idea, undertake market research, and then write a business plan. The organizing context was chaotic and highly personal. The process defied distinct stages of development, growth and expansion. I was nearing the end of autumn at the start of my second year in the PhD program and I was struggling to secure funding for my research topic of ‘sub-national climate diplomacy’. Tutoring did not offer enough hours or a pay rate on which to subsist for long. As I had to cover tuition fees and living expenses, my savings were dwindling. All of this was cause for me to be concerned for my future. I was under pressure to move on, as some others had, but at the same time I felt a responsibility to act on climate change and was inspired by the Scottish government’s ambitions to deliver a low carbon economy.

Perhaps what makes sustainable entrepreneurs unique from other entrepreneurs is that for them, tackling climate change is a matter of at least equal importance to achieving commercial success. I felt a deep sense of responsibility to act in response to my research findings, so the discovery of sustainable entrepreneurship as a distinct academic field offered me a means of integrating theory with practice that was consistent with my values. All the time I had been spending in the field outside of my academic office, organizing events, arranging coffees with policy-makers and business leaders, lobbying local law firms or non-profit organizations for event sponsorships, and bringing people together to share knowledge could constitute a rich, contextualized exercise in empirical data gathering that wasn’t reducible to mere anecdotal evidence. Over time I discovered that the majority of sustainable entrepreneurship research is not carried out by sustainable entrepreneurs themselves, but rather is carried out primarily by career academics. This realization led me to want to develop a research approach that could either aid other researchers who may want to become sustainable entrepreneurs or sustainable entrepreneurs who may want to do academic research. I also wanted to provide other types of entrepreneurs (e.g., environmental, ecological, sustainability, social) with the experiential data and case evidence they might need to assist them in their efforts to combat climate change more effectively. My academic training and the creative drive to start-up a new venture also created opportunities in the academic universe. By making time to engage directly with communities of practice, I gained greater access to information and a more nuanced view of the institutional ecosystem I was operating in. I was also able to foster relationship building between departments as well as between practitioners and researchers working in similar fields. I got to know some
of the people working in fields of practice who had served as the subjects of academic research, and I was able to point them in the direction of that research.

My approach was not without pitfalls. I was lacking a methodological toolkit and an understanding of how other researchers before me had set out on a path to create new ventures in response to climate change. I was grateful that some pioneering academics had developed theories of sustainable entrepreneurship supported by empirical data collection and analysis. However, there was a gap in theory for understanding the problem of climate change as it pertains to the practice of sustainable entrepreneurship as well as an absence of case studies detailing strategies employed by sustainable entrepreneurs to capitalize on business opportunities presented by climate change. While there was an abundance of research on corporate climate change strategies and leadership practice, these literatures address entrepreneurial processes that are advantaged by access to resources in the form of a proven revenue model, recognizable brand or track record. Unlike sustainable entrepreneurs, attempts made by corporate executives and managers to address climate change through organizational transformation or innovation, benefit from an established position. They have the capital resources to recruit talent or acquire technology products and a management structure in place to allocate resources and test products prior to attempting to scale them. By contrast, entrepreneurs must build an organizational structure in situations often characterized by personal and professional risks in an environment replete with uncertainties. Entrepreneurs operate with limited resources, under severe time pressures, with no guarantees as to when and how the market will respond to their value proposition or product (York & Venkataraman 2010). Formulating a plan and devising a strategy that could also account for climate change, while at the same time addressing the fundamental challenges implicit in new venture creation, is a challenging task. This task may be made easier by a more widespread availability of case studies generated by sustainable entrepreneurs themselves using a reflexive autoethnographic approach.

By the end of my first year, I had successfully passed my review with the exam board. But the dropout rate was noticeably climbing amongst my fellow enrolees. As such a small percentage of them were able to secure support to continue their research beyond the first year, many went in search of their livelihoods elsewhere. Yet where others interpreted the absence of funding as a failure or even a rejection of their capacity to be serious academic researchers, I viewed the University itself as a rich institution rife with opportunity. Thus, my journey into sustainable entrepreneurship began in a university setting as part of PhD program in politics. Though I would later leave the School of Social and Political Science to join the School of Geosciences, my ongoing affiliation with the University of Edinburgh throughout this transition period provided me with the professional credibility I needed to start identifying suitable mentors, developing access channels to resources, and building my network. The eventual result, ‘The Scottish Global Relations Forum (SGRF),’ was to be my first attempt in a series of attempts to tackle the problem of climate change using sustainable venture creation as a catalyst.
3.2. Context: the political economy of energy independence in Scotland

The political economic context unique Scotland during the period of 2009-2014 could largely be characterized by public, private and third sector organizations as well as individuals all vying to influence the Scottish government’s agenda to deliver a low carbon future for Scotland and the wider world. Energy resources play a significant role in the political economy of Scotland due to its territorial claims over what were once vast North Sea fossil fuel reserves and, more recently offshore wind, wave, and tidal power reserves. The consummate case for state sovereignty is intertwined with the case for entitlement over the economic gains to be made from exploiting these resources in what could be or might have been Scotland’s sovereign borders. Beginning with the coming on-line of North Sea oil in the early 1970s, the Scottish Nationalist Party (SNP) was quick to frame Scotland’s long history of struggles within the UK as having reached an apex with the potentially lucrative revenue streams from independent oil production and distribution. ‘It’s Scotland’s oil,’ fast became a known catchphrase for harnessing pre-existing popular discontent with England in particular, which caught on rather successfully, winning unprecedented gains for SNP parliamentarians in the 1974 UK elections (Russell & Kelbie 2005). Scotland’s geographical proximity to the discovery of oil in the North Sea helped to reinforce arguments that Scottish citizens had a territorial right to exploit whatever gains from extraction were to be made; this, despite the fact that without formal independence from the UK or the Crown, any claim to a right was neither constitutionally guaranteed nor legally verifiable. Although a 1975 memo released in 2005 by the UK Cabinet Office under the 30-year rule indicated that Westminster was genuinely concerned over the prospect of the SNP’s insistence that an independent Scotland would be economically viable if licensed full rights to North Sea oil extraction. Upon review of the memo, former SNP party leader, later to become First Minister, Alex Salmond remarked “that a UK government would have to divert huge resources to Scotland for it to be as well off as under independence (BBC 2005).” Further testament to the potential for an independent Scotland to have achieved significant revenue streams if licensed the privilege of extraction within its argued North Sea remit were reinforced by an additional report issued on behalf of leading Scottish economist Professor Gavin McCrone. The report, later made public by the Blair administration under the UK Freedom of Information Act, claimed that profits accumulated from North Sea oil meant Scotland’s currency “would [have] become the hardest in Europe, with the exception perhaps of the Norwegian Kronor.” While ultimately the SNP’s claims to North Sea oil revenues were not officially recognized by Westminster, the precedent set was arguably of greater importance in terms of the popular support it generated among Scots seeking autonomy. By creating a link between Scotland’s historical struggle within the UK and the potentially competitive gains from resource extraction within proximity of the Scottish territory, the SNP was able to successfully leverage a political economic approach to capitalize on latent appeals to popular desires for an expanded role for Scotland within the UK as well as on the world stage.

Over two decades have passed since the discovery of North Sea oil and while Scotland under the majority leadership of the SNP has since made considerable progress in its quest for more autonomy, former First Minister Alex Salmond’s strategy
of linking resource wealth nationalist ambitions encountered serious challenges during the 2015 Scottish Independence Referendum. With rapidly falling oil prices and speculation about the robustness of remaining fossil fuel reserves, the SNP’s economic case for independence could no longer rest on fossil fuel wealth alone. Although the legacy of Scotland’s oil claims continues to resonate with supporters of independence as a source of revenue and a missed opportunity for sovereignty outright. Inspired by the same strategy which the SNP successfully employed to exploit prospective gains from North Sea oil, the Scottish government’s current planning framework favours RE to fuel Scotland’s sovereign ambitions. With a competitive posture to outdo Westminster, the Scottish government has pledged to surpass targets set by the UK to meet 15 percent of electricity demand with renewable energy (RE) sources by 2020, as well as Europe’s commitment to meet 20 percent of demand by 2020 by setting an ambitious target to meet 100 percent of electricity demand supplied from RE by 2020. Also, in 2008-2009, guided by the rules laid out by the Renewables Obligation Scotland (ROS), Scottish and Southern Energy (SSE), Scotland’s largest private company, managed to surpass all UK electricity suppliers with 18.6 percent of the total RE share of delivery, compared to EDF and RWE Npower who managed 17.6 percent and 16.7 percent respectively (Ofgem 2010). The ROS, as a complement to the UK government’s Renewables Obligation (RO), requires Scottish energy companies to source an increasing amount of their electricity generation from RE systems. Under the ROS, Scottish Renewables Obligation Certificates (SROCs) are issued by Ofgem to licensed suppliers for each megawatt hour of renewable output generated. Suppliers then fulfil their obligations by presenting sufficient SROCs at the end of every month. If and when energy suppliers fall short of the SROCs required, they are mandated to pay a matching amount into a general fund, the proceeds of which are then repaid on a pro-rated basis to companies that comply. The system is designed to incentivize renewable generation into the electricity market through 2027 and is complementary to a Feed-in Tariff (FIT) system designed to incentivize micro-RE production (UK Office of Public Sector Information 2008). Concerning the broader challenge of global climate change, the Scottish government has also set ambitious targets for carbon reductions. Scotland’s Climate Change Delivery Plan promises to reduce its emissions by at least 80 percent from 1990 levels by 2050, “with an interim emissions reduction target of at least 34 percent by 2020, increasing to 42 percent if the EU increases its 2020 target to 30 percent in the event of a global deal on climate change (Scottish Government, April 2009).” Although questions have emerged as to the actual extent to which the Scottish government may realistically be able to comply with its carbon reduction commitments, such efforts help to shape the competitive landscape in which companies new and old operate and interact with government and third sector organizations. This interaction between market players shapes the market landscape which sustainable entrepreneurs must enter into and vie to capitalize on.

As a matter of policy, the Scottish government is not only concerned with resource extraction from RE, but also with the challenges of climate change. The focus of energy policy is to “achieve sustainable economic growth”. Political economic aims are married with the need to address climate change as a matter of policy
implementation, with RE production seen as a means to achieve job creation while mitigating GHG emissions. The policy also recognizes the need for supply-side transformation and alludes to the broader implications of doing so for the benefit of the planet: “Energy use is one of the biggest contributors to carbon emissions, emissions which threaten the sustainability of our planet (Scottish Government, Sept. 2010).” A twofold strategy for: (i) reducing carbon emissions and addressing other ‘climate change objectives’ and (ii) encouraging public reductions in overall energy consumption is addressed to all stakeholders, creating a framework for engagement with business as well as third sector organizations within and beyond Scotland. This encouragement of stakeholder participation in policy was exemplified by the formation in 2009 of ‘Scotland’s 2020 Climate Group,’ an independent taskforce comprised of leaders in business, academia and third sector organizations designed to assist the Scottish government with delivering on its ambitious 2020 electrification and decarbonization targets. The taskforce is comprised of a Main Group which provides direction and Sub-groups with responsibility divided across some of Scotland’s major industries and areas of interest. These are: Transport, Built Environment, Finance, Behaviour Change, Research and Innovation (Scotland’s 2020 Climate Group 2016).

With a commitment to reducing carbon emissions by at least 42 percent by 2020, Scotland’s Climate Change Bill (2009) is ambitious in a number of key areas ranging from annual targets to delivery mechanisms (Scottish Government 2010). The Scottish government insists that its Climate Change Bill will not only help to drive the transition from carbon-intensive to sustainable economic growth, but is also part of a broader, global climate change agenda – an agenda which, according to the Scottish government “has a significant role to play in supporting the transition of other countries through international collaboration, the sharing of information and understanding, and by pioneering new technologies able to de-carbonize energy systems and enhance adaptation to the impacts of climate change and environmental degradation (Scottish Government, Sept. 2010).” This additional element of the Scottish government’s climate change policy had direct relevance for the Scottish Global Relations Forum (SGRF) co-founders who sought to capitalize on the global positioning of the Scottish government through partnerships aimed to enhance the Scottish governments diplomatic influence over climate change- and security-related issues. For example, Scotland’s involvement in the UN’s States and Regions Program, cooperation with the Brussels- and New York-based Climate Group and participation in the signing of the ‘Montreal Declaration of Federated States and Regions (The Climate Group 2010),’ provided a rich network of opportunities for advance mediation services which the SGRF sought to exploit. The Scottish government’s climate change agenda was highly influenced by the behind-the-scenes lobbying of the ‘Stop Climate Chaos Coalition Scotland (SCCCS),’ a third sector activist umbrella group. SCCCs’ stated goal is to “ensure Scotland plays its fair part in tackling climate change and that the commitments set out in the Scottish Climate Change Act are achieved, including targets to reduce emissions by 42% by 2020 and 80% by 2050.”
These political economic factors serve to illustrate the context in which the Scottish Global Relations Forum (SGRF) venture was created. At the time, with the prospect of an impending referendum, a space was potentially building to influence the international relations of an independent Scottish government. Although the latter was never an express aim of the SGRF, certainly this prospect served to influence the opportunities available to the group. The Scottish government’s engagement with international networks and participation in framework agreements aimed at raising their profile in the global effort to address climate change created an opening for the SGRF to act as influencer. At the time with the SGRF was being created, there were for example, several upcoming events organized in cooperation with the Scottish government to be hosted in Scotland that would come to attract the types of influential individuals whom the SGRF initially sought to target as supporting partners and participants. Former US Vice President Al Gore was scheduled to be the keynote speaker at the Scottish Low Carbon Investment Conference (SCLIC) on the 27th and 28th of September 2011 in Edinburgh. Not long after a Scottish delegation was also scheduled to attend the European Conference of Regions on Climate Action on the 20th and 21st of October in Lyon, France. Then on the 18th of November, former UN Secretary General Kofi Annan was scheduled to address the Scottish Council for Development & Industry (SCDI) in Glasgow. These events which bore a close resemblance to the diplomatic activities of sovereign nation-states provided additional inspiration and potential networks of influence which the SGRF aimed to mould into a commercial opportunity.

As a first-year researcher, I had specialized in sub-state climate diplomacy with Scotland as the focus of my investigation. This area of research seeks to understand and describe how devolved governments operating at below the level of recognized nation-states, increasingly leverage global networks of influence in order to further their political economic aims, including addressing climate change (Keating & Aldecoa 1999). Given Scotland’s territoriality and pursuit of greater devolution of powers to the Scottish Parliament, a large number of uniquely ‘Scottish’ organizations, as distinct from ‘British’ organizations are in operation. Many of these, particularly in the third sector, seek to address climate change. The private sector is also particularly interested in the low carbon and commercial potential of RE, given the expanse of resources and supporting policy frameworks detailed above. The combination of public, private and third sector action creates a dynamic ecosystem in Scotland with a variety of players. Regarding climate change, organizations such as Scottish Development International (SDI), Scotland’s Futures Forum (SFF), Scotland’s 2020 Climate Group and the Scottish Low Carbon Investment Conference (SLCIC) have intersectional and overlapping goals broadly aimed at raising the profile of Scotland’s low carbon agenda on an international stage. Beyond these, I had identified a gap in the market to develop a model that could address not only the environmental aspects of climate change, but also the underlying resource and related security challenges, which these organizations did not address. I therefore saw an opportunity to help further Scotland’s climate change agenda by raising the profile of Scotland and Edinburgh as a hub of diplomatic excellence offering mediation expertise and exportable knowledge within this broader scope. There was no single organization dedicated to exporting or importing mediation
services in areas traditionally addressed by emissaries and diplomats working as part of a national state apparatus with designated oversight in areas of foreign policy. One reason for the gap was that Scotland is not a sovereign nation and as such, matters of foreign policy are reserved to the UK government. However, while researching the ecosystem of organizations addressing climate change, I uncovered a rich and more nuanced sphere of climate change-related activity where influential individuals were engaging in acts which bore a high degree of similarity to diplomacy. Such activities, while not part of any official foreign policy framework in force on behalf of the Scottish government, did fit within the ‘Scottish Government’s International Framework.’ This framework called for, “managing Scotland’s reputation as a distinctive global identity, an independent minded and responsible nation (Scottish Government 2010).”

3.3. Building the network

Several questions proceeded from the point of identifying a market gap for addressing climate change and security challenges through the creation of a new venture. These were no different in basic terms, from those which any type of entrepreneur may ask in regard to any other market, e.g., what is the size of the market? Where lies the competition? What business model could add value to the process? Is there an opportunity to generate a sufficient revenue stream? If so, what resources are required for capturing that revenue stream? Critically, as an outsider I lacked information about the organizational hierarchies and positions of influence of those active in the market. This was a matter of great strategic importance, which could serve to guide my thinking about how to design and implement an effective business model. I had assumptions about who the key influencers were, but no empirical data with which to test these. I was also time- and resource-constrained and in need of an efficient means of accessing this data. Organizing an event can be a good way for researchers to learn more about communities of practice or for entrepreneurs to get to know more about their market and make valuable connections with more experienced practitioners. Within a university environment, the resources to host and coordinate logistics are often available in the form of rented room space with a variety of options for presentation format and catering set up. Funding support is also often available for students seeking to invite professionals into the university environment. While this funding is typically reserved for student organizations, rather than individuals, I sought to circumvent this requirement through pursuit of direct sponsorship. After spending some time doing my own Internet-based searching, I came across a unique organization on campus called the ‘Public Policy Network (PPN).’ While no longer in operation, the stated aim of the network, according to their website at that time was to “[facilitate] events and processes of dialogue and deliberation on a range of policy topics” and also to “[foster] research and training on participatory and deliberative democracy (Participation Compass, 2016).” I organized a meeting with the head of the PPN, who invited me to submit a summary proposal outlining the underlying rationale and target deliverables for an event.

I chose to focus on Scottish policy-making, framed in the context of global economic and climate crises. By conceptually adjoining climate change and economy, my hope
was to attract a wide, diverse audience with an interest beyond environmentalism to include resource challenges. The event would be offered freely and openly to the public, in the style of a forum and audience members invited to engage directly with speakers to encourage knowledge exchange. I would act as note taker and rapporteur, tasked with capturing the main points of each guest speaker presentation and then compiling a final report which could then be disseminated to the speakers and audience members. Audience members would be encouraged to sign up to a mailing list so that they could also receive a copy of the report. Taking this approach, I outlined the objectives in the proposal to PPN as follows (Bruner, 6 June 2010):

- To facilitate knowledge exchange between university experts and local public and private practitioners on issues of economic, social and environmental importance.

- To create a forum for interdisciplinary discussion and debate between faculties in the natural and social sciences.

- To collectively assess and debate the strengths and weaknesses of Scottish policy-maker responses to global economic and climate crises.

- To raise public awareness about how global challenges are being met on the local scale.

To further define the scope of the event for marketing purposes, I employed the following title, “Environment, Energy, Economy: Scottish Solutions to Global Economic & Climate Crises.” This title served to clarify the primary aims of the event: (i) to include and attempt to move beyond the topic of climate change to address more fundamental, underlying resource issues and (ii) to identify approaches utilized in Scotland as a sub-state region that could be relevant for other states and regions. Insofar as the objective of the proposal was to convince PPN to provide sponsorship and funding, it achieved this success. A contribution of £500 was agreed to cover the cost of hiring an event space and providing refreshments for a target audience of up to 100 attendees. The sponsorship of a registered university organization provided me with access to campus resources and the credibility I needed for attracting public interest. However, the amount of funding limited other logistical considerations such as marketing, cost of travel for speakers and a wine reception. I had considered the wine reception an important marketing tool to attract influential speakers as panellists and to create networking opportunities for them to interact with audience members as well as with one another. I voiced this concern to the PPN director who shared with me what would later prove to be a vital piece of information: a negotiation had been taking place between the University of Edinburgh School of Geosciences and various wealthy alumnus to establish an ‘Edinburgh Centre on Climate Change (ECCC).’ The center was to be established with a mandate to find solutions to climate change through support for thematic events, ideation and innovation. Although the center was still in its formative stages at the time of the event, it would require the leadership of a new Executive Director. The top candidate for the position of Executive Director was Dr Andrew Kerr. Dr Kerr had been acting Director for the
Scottish Alliance for Geosciences, Environment and Society (SAGES). While no longer in operation, the stated aim of SAGES was to pool “world-leading expertise in geoscience and environmental science from across Scotland’s research base, creating a multi-disciplinary alliance at the forefront of earth and environmental research (SAGES 2016).”

One key aspect of growing your network as an entrepreneur is getting referred by senior professionals already in your network to other senior professionals who are outside your network. A referral from the PPN, got me a face-to-face meeting with Dr Kerr of SAGES. It was at that meeting, I learned that Dr Kerr was already in the process of making his transition away from SAGES into a new role with the ECCC. Dr Kerr had access to a modest funding source for event sponsorships, such as the one I was proposing. The prospect of a co-sponsorship opportunity with the PPN, as well as the concepts and target deliverables outlined in the proposal were enough to convince Dr Kerr to provide an additional £500 needed for marketing, a travel bursary for guest speakers and a wine reception. Having now secured adequate funding to make the event a reality, I coordinated with the PPN and Dr Kerr to agree a suitable date and venue. Once it was agreed that the event would take place on the 9th of June at 1pm in David Hume Tower, the task of recruiting suitable guest speakers and arranging the topics for each speaker panel began. The guidance of Dr Kerr and the PPN was to prove additionally helpful in identifying potential invitees with suitable expertise to address the broad range of prospective topics. Having the benefit of introductions and referrals from both the co-sponsors enabled rapid progress toward populating the event itinerary with a committed speaker roster suitable for attracting the target number of audience members. Simon Pepper OBE, agreed to act as event Chair. Simon had served as Head of WWF Scotland for 20 years and was also a member of Scotland’s 2020 Climate Group. His commitment was instrumental in earning the trust of additional speakers who followed. The final list of guest speakers included (Bruner, March 2010):

- **Paul Tetlaw, Chair of Transform Scotland**
- **Phil Matthews, Senior Policy Advisor at the Sustainable Development Commission**
- **Dr. Justin Kenrick, University of St. Andrews, Sustainable Development**
- **Prof Janette Webb, University of Edinburgh, Sociology**
- **Patrick Harvie, Member of the Scottish Parliament & Convener, Scottish Parliamentary Committee on Transport, Infrastructure and Climate Change**

An honorarium for guest speakers was not within the available budget, so as a concession I offered Transform Scotland and the Sustainable Development Commission each a partnership opportunity to market themselves by having their logos added to the event flyer alongside those of the ECCC and PPN. Once all speakers had confirmed their intent to participate, I circulated a general invitation email with the flyer as an attachment to various University of Edinburgh departments. Each speaker also contributed to the circulation of the email and flyer to their respective lists comprised of organizations and specialist groups throughout Scotland. In addition to this digital marketing approach, I also had the university print
shop produce three large full colour posters, which I posted in the main hallways of campus buildings frequented by students in the School of Social & Political Science and School of Geosciences. The event managed to attract approximately 80 participants and was a vibrant and lively atmosphere, that received positive feedback from the sponsors, guest speakers and audience members.

After the final guest speaker had delivered their presentation and audience members had engaged in a good discussion on the closing topics, event Chair Simon Pepper summarized key points and then invited participants to join the wine reception. The reception provided a good opportunity for networking, as was intended. I was able to interact with guest speakers and audience members, which helped to grow my network and to gain a better understanding of the relationships between the various organizations and individual participants. It was also during this wine reception that one audience member made a point to approach me and to tell me about a unique series of informal, but influential talks that had taken place in Edinburgh throughout the Cold War. According to the audience member, these talks were known as the ‘Edinburgh Conversations.’ The Edinburgh Conversations were a series of historic meetings (1983-89) which had been co-founded by the former Principal of the University of Edinburgh, Sir John Burnett. The head of the University of Edinburgh’s former ‘Centre for Defence Studies,’ Prof John Erickson was another co-founder, whose personal reputation for neutrality and excellence in historiography was instrumental for bringing together participants in these talks from both sides of the Iron Curtain. These individuals who Prof Erickson had interacted with throughout the course of his research, were experts in the state security, intelligence, diplomatic and journalistic fields. Erickson was a known expert in the history of the Soviet Union, having composed an acclaimed two-volume history detailing the role of the Soviets in World War II. These were, Stalin’s War with Germany: The Road to Stalingrad (1975) and The Road to Berlin (1983). His work and his fluency in the Russian language earned him rapport and the mutual trust of high-level operatives in the UK and US as well as with the Soviet Union (Telegraph, 2002). Discussion topics revolved broadly around security issues and the environment. An additional piece of information shared by this audience member was to prove instrumental in the formation of what would become my first creation in a series of sustainable ventures: the Scottish Global Relations Forum (SGRF). The audience member informed me that a former graduate of the University of St Andrews by the name of Iain Russel had acted as personal assistant to organizers of the Edinburgh Conversations, who had all since passed away. Iain was now the Managing Director of Mediation Scotland, an Edinburgh-based company which provided professional mediation services to corporate and individual clients. After conducting further Internet-based research to validate the audience member’s claims, I coordinated with the event speakers to produce and circulate a final report summarizing the key points. I used the report as a conversation piece in a cold email to Iain Russel, outlining to him the market gap I had identified and proposing further discussions to explore potential collaboration. Iain was quick to respond and suggested a suitable time to meet in person.
3.4. Formulating a plan and devising a strategy

My first in a series of exploratory meetings with Iain Russel, Managing Director of Mediation Scotland took place on 30th June 2010 and lasted for a period of six months. The purpose of these initial meetings was to assess the viability of a mediation business model aimed at addressing climate change and security challenges, explore potential partnership opportunities and agree an approach to the market. In the first instance, we sought to differentiate ourselves from the Edinburgh Conversations. While the example of the Edinburgh Conversations was encouraging, we agreed that the challenge of climate change and new security challenges could not be addressed in a binary or bilateral context. The Cold War was over, and the balance of power was shifting toward multilateralism. The rising influence of emerging market players, including India and China as well as the consolidation of wealth and power in the hands of a small number of corporations, necessitated broader engagement. Aside from this shift in the global balance of power away from US-UK-Soviet relations, the problem of climate change itself could not be addressed without multilateral cooperation. At the same time, Iain and I both shared a scepticism of the UN-led COP framework to reliably enforce whatever agreement may result. As an alternative we looked to the R20 Regions of Climate Action and the states and regions framework for cross-sector engagement led by the Brussels-based Climate Group for examples of more bottom-up models that could in effect, more locally and thus reliably manage and implement sustainable solutions in our view. If our aim was to leverage Scotland’s ambitions to position itself as a global climate change player, then it also made strategic sense to create a model that could draw on available resources in the form of professional connections, access to influential individuals and networks within Scotland’s remit.

Initially, our discussion of the business model revolved primarily around two recurring and contradictory aims: a need for transparency and a need for privacy. A unique selling point of the original Edinburgh Conversations was a near guarantee of discretion and privacy for participants. In the absence of the Internet, high-level dialogue could be kept discrete. State security and intelligence officials, diplomats and journalists who were participants, had to worry far less about unsanctioned privacy breaches compared to their 21st century counterparts. Overhead costs of personnel, travel and accommodation could be financed by the state and institutional budgets of those involved and did not require a revenue model, branding and marketing strategy to operate. Our intention to broaden the range of participants outside of the government sphere, including representatives of private and third sector organizations, would have cost implications that would not be self-sustaining in the same manner as they had been with the Edinburgh Conversations. We also valued transparency and were in agreement that the effectiveness of our approach would largely be determined by the extent to which actionable outputs from each roundtable session could be agreed, captured, recorded, tracked, managed and strategically disseminated. The main commercial advantage of engaging in business development, rather than deferring to an informal process with greater similarity to the Edinburgh Conversations was that we could implement a revenue generating approach and structure that would not depend on the ongoing commitment of any
one individual or the dedication of resources from individual participants. An organization with a revenue stream, regardless of its incorporation status (e.g., charity or trust, company limited by shares or limited by guarantee) could survive a change in leadership and had the potential to add value into the future. Our main commercial disadvantage was that the operational costs of an events-based organization are high. This is particularly the case when catering to influential participants who expect to be hosted in exquisite venues as well as to stay in four-star hotels and be treated to fine catering or fine dining accompanied by good wine and in our case, good whisky. Prof Erickson was himself, also a unique personality. By virtue of his academic achievements and his personal rapport with influential individuals on both sides of the Iron Curtain, Prof Erickson had earned a reputation as a trusted, neutral facilitator and subject matter expert built up over many years of dedication to his research. Iain Russel also had a reputation for mediation excellence and an organizational brand with an established track record in Mediation Scotland that could help to attract the high-level participants we sought to involve. However, the inherent complexity of climate change in its various facets encompassed a wide array of underlying factors from resource scarcity and environmental conservation to energy security. These underlying factors were each warranting of their own experts, and it would be challenging to find a single individual in the likeness of Prof Erickson, with the rapport to gain the trust and respect of influential participants across all the relevant domains.

After my first few meetings with Iain, it became clear that additional input and resources would be required to develop the business plan further and to address some of the immediate strengths and weaknesses of the proposed model which we had identified in initial discussions. We agreed that the ECCC might be the first of a host of organizations to offer funding for our efforts and we set out to draw up a working proposal aimed at Dr Kerr to win his support in securing funds for further research and development. In addition to drawing up this funding proposal, Iain had an in-depth awareness of the potential sensitivities of our efforts to create a new venture in a market where a good deal of activity was already taking place at high-level. The nature of this activity was also considered sensitive enough to warrant an inclusive approach that would not isolate potential partners from engaging with us if and when a suitable business model could be developed and implemented. Scotland’s 2020 Climate Group was one such organization that was already in operation with the support of the Scottish government and some influential Scottish industry players such as Scottish & Southern Energy, Gleneagles and Buccleuch Estates. However, the 2020 Group had limitations in terms of its structure and capability. Operationally it depended on the voluntary support and actions of individuals with time constraints in order to fulfil its aims. Without a revenue generating architecture, the organization lacked the capital resources to devote to implementing the actions it identified as helping to further the Scottish government’s progress toward a low carbon economy. The model was focused on Scotland in terms of its target objectives and did not have a distinctly global outlook. These were areas where our model might find an appropriate niche to add value. There was some discussion on the amount of funding that was needed in order to complete the research and development process. Iain recommended £100,000 as a base figure, cautioning that
the amount of funding would be subject to degree of interest and strength of the proposal. He mentioned a possible approach to members of the Industry Taskforce on Peak Oil & Energy Security (ITPOES) with whom he had a personal connection, as well as a variety of other influential individuals and organizations who may help with providing feedback on concept, while enabling us to vet prospective figureheads who could comprise an SGRF Advisory Board or a Board of Trustees. These figureheads might themselves be invited as guest facilitators to chair structured conversations based on specific topics related to climate change and security challenges. In turn, our steering group could provide them with a voice in selecting which topics to address. This approach could help to provide a constant flow of iterative feedback from influential subject matter experts, ensuring alignment with the professional needs of potential participants, their organizations and partner networks. On this basis, we drew up a shortlist of prospective supporters and proceeded to approach the ECCC. We also agreed to co-draft the full proposal, which we titled ‘Outline of Proposal for the Scottish Global Relations Group.’

Iain was of the view that the direction of the proposal and the extent to which the proposal might attract the interest of leading Scottish figures was contingent upon the professional relevance of the chosen topics to those leading figures and their organizations. He cautioned that the creation of a steering group to further develop the SGRF ought to be ‘close-nit’ and to include only the ‘necessary’ partners. As far as Iain’s personal involvement in the process of creating the venture, he agreed to contribute pro bono until the proposal attracted ‘adequate’ funding. As far as the official involvement of Mediation Scotland was concerned, this would rest on the applicability of the SGRF’s aims to the organization’s central focus on mediation. He further encouraged me to go to work on a ‘statement of purpose’ that could elucidate the various themes and with respect to maximizing interest and capacity among the influential individuals and organizations we might agree to engage (Bruner, 11 Jan. 2011).

At the conclusion of these initial meetings and prior to making an official approach to Dr Kerr and the ECCC for potential funding support, the following action items were agreed in regard to strengthening our proposal:

(i) Clarity on topic(s) and discussion points
(ii) A more narrow/definitive approach with greater specificity in terms of value, inputs and outputs
(iii) Logistical considerations which complement this greater specificity
(iv) A list of possible options for the project process and style of organization
(v) Added substance in light of Scotland’s role as uniquely placed to provide a neutral venue for sensitive discussions on climate change and security
(vi) A single initiative to guide the process

Pending satisfaction of the above, the following action points were agreed:

(i) Phillip will revise the proposal and email it to Iain for his consideration
within the coming week.

(ii) Phillip will arrange a meeting between himself, Iain and Dr Kerr, pending Iain’s satisfaction with the revised proposal.

(iii) Phillip will arrange a meeting with Ruth Wolstenholme, Managing Director of the Scottish & Northern Ireland Forum For Environmental Research (SNIFFER) to get her feedback on the proposal.

(iv) Phillip will arrange a meeting with Philip Wright, former Deputy Director of Climate Change for the Scottish government to get his feedback on the proposal.

(v) Phillip and Iain will arrange a meeting with Martin Valenti, Vice Chair of Scotland’s 2020 Climate Group to ascertain his perspective on the proposal.

I followed through with redrafting the proposal over the following week. Iain provided initial comment and from there we agreed to take the proposal forward in a meeting with Dr Kerr of the ECCC. That initial meeting proved a success. Dr Kerr, in his capacity as new Executive Director of the ECCC agreed to provide 6 months of funding support for the research and development phase of what we would later rename the ‘Scottish Global Relations Forum (SGRF).’ This support, in the amount of £20,000 enabled me to devote my full time and attention to the venture creation process. It also gave Iain reassurance that our efforts were worth pursuing on a commercial basis. While there were still many unanswered questions regarding the structure and organization of the business model, the concept seemed robust and compelling. Additional feedback sought from meetings with Ruth Wolstenholme, Philip Wright and Martin Valenti further confirmed this. From the start of April 2011, we agreed to form a steering group and to meet on a bi-monthly basis at the offices of Mediation Scotland. Philip Wright, as the most experienced member of the group, agreed to assume the role of Chair. The SGRF would require an original brand and logo, to be used on supporting materials, which the steering group agreed to co-develop over the 6-month timeline for which we had an operational budget (Bruner, 13 April 2011). I took inspiration from the Council on Foreign Relations as well as the colours of the Scottish flag in the final design:
3.5. Statement of purpose

The stated purpose of the ‘SGRF’ was to “transform the way international stakeholders: share ideas, identify underlying interests and agree action plans for delivering solutions to climate and security challenges.” To this end, the SGRF sought to influence and provide elite facilitators to engage invited participants in “structured conversations, workshops and seminars,” each centred around a common climate and/or security-related topic (Bruner, 22 July 2011). The SGRF had an additional mission to help re-establish Scotland as “a nation where those with diverse interests can come together to exchange knowledge, build relationships and find common ground.” With support from the ECCC, which prior to official launch would become the ‘Edinburgh Centre for Carbon Innovation (ECCI),’ the steering group co-designed and experimented with a number of conversation-style approaches which were aimed at attracting interest from individuals at a high-level in and beyond Scotland. The SGRF would invite participants who joined as invite-only guests with the opportunity to share candid views and opinions in a private and confidential setting, guided by expert facilitators. The aim of these structured conversations was to provide participants with innovative outlets to exchange knowledge with a wider selection of their peers in a manner beneficial to them in personal or professional capacity. It was this latter aspect that was designed in an attempt to balance the need for privacy with the desire for transparency.

The SGRF steering group were motivated by shared concerns that ranged from changing climate and depleting resources to resource competition and environmental conversation. They aimed to better understand “risks and uncertainties,” which stood to impact individuals and societies. These risks and uncertainties were understood to at times inhibit cooperation between potential partners in their respective practitioner domains, as well as to potentially limit communication. Particularly for the private sector, perceived panic or insecurity about a range of issues could translate into a lack of investment or involvement in what the steering group members assumed might otherwise be the cooperative delivery of sustainable solutions. Without the confidence and opportunities needed to deliver on solutions designed to help create a sustainable future, prospects for solving complex global problems are greatly diminished.

3.6. Structure of organization

The SGRF was headed by a steering group, representing the public, private and third sector. Once formed, the steering group met on a bi-monthly basis for a duration of approximately 9 months and was comprised of the following participants:

- **Iain Russel**, Managing Director, Mediation Scotland
- **Dr Andrew Kerr**, Director, Edinburgh Centre for Carbon Innovation (ECCI)
- **Philip Wright** (Chair), former Deputy Director of Climate Change for the Scottish Government
- **Ruth Wolstenholme**, Managing Director, Scottish & Northern Ireland Forum For Environmental Research (SNIFFER)
• Martin Valenti, Vice Chair, Scotland’s 2020 Climate Group

Operationally, the SGRF model was designed to allow participants to hone-in on specific challenges on a project-by-project basis to maximize opportunities for context-specific knowledge exchange and meaningful partnership building with a view to delivering actionable outcomes. Structured conversations in a private, confidential setting were considered advantageous to the partners over public conversations which were common throughout Scotland organized around similar topics and could therefore potentially provide participants with opportunities to:

- Build co-operation
- Engage in more effective communication
- Diagnose underlying problems and impediments
- Identify the real issues
- Understand the interests, concerns and aspirations of others
- Establish a route map for addressing the issues
- Make better-informed decisions
- Plan for the future sustainably

In addition, SGRF ‘spin-out’ projects or workshops were designed to provide participants with a range of innovative options for exchanging knowledge, offering conclusions and exploring next steps with wider public audiences. The combination of hosting private conversations complemented by public spin-out workshops, was designed to allow participants to express their candid views and opinions confidentially, while at the same time providing them with opportunities to publicly share those views and opinions as they saw fit – taking all professional sensitivities into careful consideration before taking action.

Spin-out workshops in a public setting would have the added attraction of enabling participants to:

- Raise their personal and professional profiles
- Seek additional expertise and feedback across sectors and borders
- Try out newly formed opinions and ideas before taking them forward
- Galvanize possible institutional and popular support by marketing actions
- Inspire follow up events and set trends
- Influence key decision-makers and opinion shapers in diverse areas
3.7. Partnerships

A source of creative tension in deciding on an appropriate business strategy for the SGRF concerned the revenue model. Would the model be more successful as a for-profit business, a charity, a social enterprise or trust? While Scotland’s 2020 Climate Group had been established to drive forward a domestic agenda, there were concerns among the SGRF steering group that the 2020 Group was experiencing limitations in its capability to deliver measurable results. The 2020 Group model was not-for-profit, but the 2020 Group also had the direct support of the Scottish government as well as buy-in from many high-level industry and third sector players throughout Scotland. The level of support was modest, however so was ours. Ultimately the steering group took the decision that the SGRF would need the institutional and organizational support of both Mediation Scotland and the ECCI in order to accelerate progress and to coordinate a pilot project to demonstrate a proof of concept. A partnership could bring the collective resources and networks of the two organizations together and would provide enough subject matter expertise to demonstrate to prospective partners and participants that the steering group had the capability to deliver measurable results. Based on this proof of concept, we would then decide how to approach the revenue model.

Mediation Scotland and the ECCI were initially viewed by the steering group as fully complementary partners for providing the SGRF with the firm foundation and resources it needed to approach the target market and successfully deliver a proof of concept in the form of a structured conversation around a to-be-identified topic involving influential individuals. Mediation Scotland had a well-established reputation for neutrality, confidentiality, experienced mediation and excellence in dealing with highly sensitive matters of public or private importance. A track record in mediation services for corporate clients would be critical for attracting the influential participants we sought to involve in a first conversation as well as on the Board of Advisors or Trustees. Iain’s personal involvement in the original Edinburgh Conversations and professional interest in exploring innovative mediums and approaches within the mediation sector to address climate change and security issues meant that his
leadership was equally critical to the SGRF venture creation process. The ECCI, while a new venture itself, had planned to take a networked approach to innovation, seeking to establish a reputation for finding and implementing low carbon solutions in cooperation with industry and the public sector, using universities as a gateway. With its position on the University of Edinburgh campus and specialism in innovation, the ECCI could provide access to expertise and talent across the range of climate change and security topics to be addressed in SGRF conversations. Dr Kerr’s personal involvement as a climate change expert, would be equally critical for demonstrating to participants a mastery of the core subject matter. A partnership between Mediation Scotland and the ECCI could help make a compelling case to other individuals and organizations to involve themselves with the SGRF and to feel confident in the capacity of the SGRF to deliver on the opportunities identified. In sum, the steering group proposed that a partnership between the ECCI and Mediation Scotland could add considerable shared value to the SGRF in the following ways:

- Shared calibre of influence in crucial policy areas and private sector circles;
- Shared access to high level decision-makers, opinion shapers and possible participants;
- Shared understanding of Scottish arena sensitivities;
- Shared understanding of urgency and need for action on climate and security issues

The steering group further identified the following key benefits to Mediation Scotland and the ECCI for supporting the SGRF through partnership:

- A publicity and collaboration resource to share knowledge, skills and training with other organizations within and beyond Scotland and to disseminate options and opinions on issues of global importance to ever wider audiences;
- A forum to attract high level interest from key opinion shapers and decision-makers across sectors;
- An outlet to expand spheres of influence both publicly, privately, domestically and globally;
- A marketing tool to raise profiles, broaden sources of funding and stimulate the interest of additional partners and clients

3.8. Phases of development

The steering group agreed to separate the process of designing and testing the SGRF model into three distinct phases of development. The first phase would aim to create a Board of Advisors or Trustees. It was agreed that the Board ought to consist of leading ‘decision-makers and opinion shapers’ based in or around Edinburgh and be broadly representative of private, public and third sector organizations with relevance to the SGRF climate change and security themes (Bruner, 12 July 2011). These influential individuals of ‘the Board’ would advise on key strategic aspects of business operations, including the incorporation structure, revenue model, selection of topics and approach to proving concept. The Board would be instrumental in the selection
of each conversation topic and would coordinate to leverage their networks of influence to draw-in participants for each conversation. If the model required further development funding or access to additional partnership opportunities, the Board could also advise or assist with this. The steering group took a view that the sensitivities surrounding the creation of a new venture in our target market could be better managed with the support of additional leading figures in Scotland who would help to attract the interest of influential participants both within and outside Scotland. The individual Board members would be selected from a shortlist which the steering group jointly produced based on the perceived value that they might add to the SGRF in terms of both relevant subject matter expertise and level of influence. Once the shortlist was finalized, approaches could be made via personal introductions and in-person meetings arranged to present the SGRF concept. In sum, the underlying objectives behind the creation of the Board were as follows (Bruner, 12 July 2011):

- **Maximize operational efficiency by reducing degrees of separation between participants;**
- **Attract the necessary experience and expertise for facilitating ‘structured conversations’ on a range of climate change and security issues, the scope of which is still to-be-determined;**
- **Locating funding sources for further business development and proof of concept;**
- **Maximize possibilities for a proof of concept to be carried out with at least one overseas partner group and/or a selection of key individuals operating overseas;**
- **Maximize medium-to-longer term possibilities for the delivery of sustainable solutions in the context of Scotland, the UK, Europe and globally**

A wider aim of this first phase was to consult with subject matter experts in different sectors in order to determine the specific topics which the steering group would seek to address as a proof of concept. If the first phase could lead to a viable proof of concept with full steering group backing, the second phase would proceed with the development of a series of structured conversations organized to address each topic. These structured conversations would take place at two levels. The first level would be classed as more private and confidential, with outputs in the form of agreed actions and summary reports disseminated only to participants. The second level would consist of ‘spin-out’ workshops. These workshops would be classed as more public and transparent, involving some first level participants in addition to the wider public. Each structured conversation would attempt to combine these two interrelated principles of privacy and transparency into a single cohesive operation, where members of the steering group and Board involved in first level conversations would be given the option to participate in a second level event, involving members of the wider public. The second phase would be contingent on a formal partnership agreement being reached between Mediation Scotland and the ECCI. The mediation experience and professional track record of Mediation Scotland would fully complement first level conversations in providing a confidential meeting venue where the assurance of discretion was vital. The ECCI, with its more public-facing mandate, would fully complement second level workshops in providing an open venue which
could accommodate broader participation. The second phase therefore aimed to find an arrangement that would benefit the commercial objectives of both Mediation Scotland and the ECCI. The benefits of a formal partnership between Mediation Scotland and the ECCI were summarized as follows:

- Profile-raising, marketing and funding opportunities for Mediation Scotland and ECCI where the commercial interests of both organizations can be maximized, at little to no cost to either organization;

- SGRF structured conversations and spin-out workshops could act as a catalyst for both organizations to attract additional support from clients, partners and sponsors;

- Members of the SGRF Board would provide access to overseas networks and/or European networks not currently available to both organizations;

- The SGRF would aim to make policy influence an area of strategic importance with Mediation Scotland providing a confidential venue for networking and strategizing (i.e., policy formation) and the ECCI providing a public venue for testing out new ideas (i.e., policy delivery);

- Both organizations would have access to high-level information and would have the unique ability to manage the flow of this information to practitioner networks, partners, and publics in and beyond Scotland.

If a formal partnership agreement between Mediation Scotland and the ECCI could be reached, the third development phase would aim to agree an incorporation structure and register the model. In line with the previous two phases, the third phase would then begin exploring and experimenting with new possibilities for revenue generation and attracting a revenue stream for the SGRF through a proof of concept.

3.9. Proof of concept

As meetings among the steering group progressed from initial conceptualization to discussions about delivery, the potential need to demonstrate value by aligning with the low carbon objectives of the Scottish government became a point of ongoing debate. While the Scottish government had set an ambitious agenda to shape the landscape of private and third sector activity through to 2020, the delivery of a low carbon economy for Scotland would largely be determined by the extent to which the private and third sector would act to support delivery of its chosen targets. On account of the lack of fully devolved powers to the Scottish government, Scotland's 2020 Climate Group was well positioned to coordinate specific actions through their model. However, in the opinion of the steering group, there remained additional opportunities for the SGRF to carry forward specific actionable items that were aligned with Scottish government policy but were not being addressed by the 2020 Group either on account of a lack of capacity or a lack of subject matter expertise.
The steering group identified two specific initiatives that were not within the scope of 2020 Group action, but fit within the SGRF’s strategic outlook:

- **Critical materials and resource efficiency for Scottish industry**
- **The North Sea Countries Offshore Grid Initiative (NSCOGI)**

### 3.9.1. Critical materials

Concerning critical materials, the steering group were aware of a growing concern among some experts at the Scottish Environmental Protection Agency (SEPA) of Scotland’s dependence on global supply chains for access to the raw material resources needed to deliver on its low carbon economic agenda. Primary extraction and the processing of mineral resources has implications for climate change as these processes are responsible for 15% of global GHG emissions worldwide (SEPA 2011). At the same time Scotland is reliant on global supply chains to meet its mineral resource needs and with the accelerating growth rates of resource consumption in both mature and emerging markets there was an increasing awareness of the risks around ensuring a steady future supply of access to these resources (SEPA & the Scottish Government 2011). Research carried out by SEPA had categorized the risks faced by businesses according to key sectors in Scotland and identified those resources subject to potential supply disruptions (Bruner, 12 Nov. 2011). Table 1 below, shows the 12 priority materials identified by the research, which SEPA viewed as critical and likely to be subject to supply shocks in the near future:

| Raw Materials Critical to The Scottish Economy (SEPA & the Scottish Government 2011) |
|---------------------------------|---------------------------------|----------------|----------------|-----------------|----------------|
| **Aggregates**                  | **Agriculture, aquaculture & forestry** | **Automotive** | **Chemical** | **Construction** | **Electronics & IT hardware** | **Engineering (including RE)** | **Food & drink** |
| **Cobalt**                      | ×                                |                |              | ×               |                            |                            |                |
| **Copper**                      |                                  | ×              |              | ×               |                             |                            |                |
| **Fish**                        |                                  | ×              |              |                 |                             |                            |                |
| **Indium**                      |                                  |                |              | ^              |                             |                            |                |
| **Lead**                        |                                  | ×              |              | ×               |                             |                            |                |
| **Lithium**                     |                                  | ×              |              | ×               |                             |                            |                |
| **Palm oil**                    |                                  | ×              |              |                 |                             |                            |                |
| **Phosphorous**                 |                                  | ×              |              |                 |                             |                            |                |
| **Rare earth elements**         |                                  | ×              |              |                 |                             |                            |                |
| **Timber**                      |                                  |                |              |                 |                             |                            |                |
| **Tin**                         |                                  | ×              |              |                 |                             |                            |                |

*Table 1: Raw Materials Critical to The Scottish Economy (SEPA & the Scottish Government 2011)*

### 3.9.2. The North Sea Countries Offshore Grid Initiative (NSCOGI)

Concerning the NSCOGI, this collaboration is led by the EU Energy Council in partnership with the UK, France, Denmark, Sweden, Belgium, the Netherlands, Ireland, Luxembourg and Norway. The Initiative seeks to define 'a framework for
regional cooperation' and to 'find common solutions to questions related to current and possible future grid infrastructure developments in the North Seas (North Sea Region Programme 2010). It aims to implement an integrated offshore energy grid which links wind farms and other RE sources across the northern seas of Europe backed by private finance. The steering group noted that there had been some positive signs toward delivery, but obstacles to cooperation remained. The European Commission’s Communication on Energy Infrastructure Priorities for 2020-2030 and the ENTSO-E Regional Group for the North Sea recognized that the 'ambitious plans for the installation of wind farms offshore' required a heightened degree of coordination, including the 'large-scale development of appropriate offshore infrastructure as well as reinforcement of the onshore grid.' It had been suggested that Norway’s hydroelectric power plants could act as a 'giant battery,' to store the power produced, releasing it at peak times, or when wind strength is low (North Sea Region Programme 2010). Several high-voltage direct current interconnectors were proposed to cable between Norway and the United Kingdom. The UK-Norway link was seen as integral first step for getting the project started (Bruner, 16 Aug. 2011).

The main issue facing the Initiative was a need to maximize resources available in the most cost-effective way in spite of major technical challenges and vast divergences across borders in terms of planning policies and measures, including system regulations. A regional, step-by-step process has been identified as the path of least resistance for proving the Initiative’s viability. To this end, the working groups collectively seek to:

- **Explore ways to develop the underpinning infrastructure (smart grids) for regional delivery in both easy- and hard-to-reach areas.**
- **Attempt to solve mismatches between regulatory legal regimes, which are a major challenge for coordinating development.**
- **Identify cost-benefit of various scenarios for development**
- **Put forth a collective vision as a way forward and to signal investors**
- **Involve governments, regulators, system operators, the Commission and stakeholders in terms of providing support, investment and feedback (input from developers and potential developers for addressing obstacles is noted as essential)**
- **Exchange knowledge with the Baltic Energy Market Interconnection Plan (BEMIP)**

3.10. Execution and logistics

The steering group proceeded to draw up a shortlist of prospective participants for a proof of concept on the topic of ‘overcoming barriers to the timely delivery of the NSOGI.’ This shortlist would map the influential individuals and organizations who the steering group could access through known networks and who shared a common
commercial interest in helping to further the development of a North Sea Offshore Grid. Participants would be invited to join in a professionally facilitated conversation hosted by Mediation Scotland for the purpose of sharing expertise, exploring options, assessing technical barriers to progress, networking and investigating remaining investment opportunities (Bruner, 16 Aug. 2011). Following the conversation which would take place over two half days, participants would be given the opportunity to present their findings and disseminate outputs to members of the general public at an open forum event, similar to the one I had organized the previous summer, hosted at the ECCI. This event would be designed to facilitate knowledge transfer and raise awareness about the many issues of broader importance which the participants sought to address and agree actions on during the structured conversations. The conversations and public event would take place over the course of 3 days:

- Day 1 would include a structured conversation in which participants engage in a mock negotiation involving a similar scenario to that of the North Sea Offshore Grid.

- Day 2 would consist of a roundtable conversation chaired by a senior energy professional from Scotland with deep knowledge of the NSCOGI. The primary aim of these roundtable conversations would be to explore interests and options for future action as well as identify pathways for disseminating outputs to key actors and actor organizations in the form of a list of agreed action items. These roundtable conversations could consist of brief introductions and short speaker contributions by representatives from the Crown Estate, the European Commission and The Climate Group alliance of States and Regions, followed by a tour of the ECCI, dinner and a night out in Edinburgh.

- Day 3 would involve a public forum in which participants would have the option to participate in a public forum at the ECCI where outputs from the roundtable conversations could be shared with audience members who from the private sector, university staff and student body, various research institutions based in Scotland and the wider public.

3.11. Outputs

Each of the previous activities would be designed with the aim of producing outputs for the purpose of delivering actionable solutions and raising the profiles of SGRF participants. Outputs proposed would include but not be limited to position papers, reports, policy briefings, audio stream/ audio podcasts, video stream/ video podcasts.

These media would be disseminated through the Scotland 2020 Climate Group and via steering group contacts in the Scottish Government. The steering group considered that the dissemination of outputs might occur in separate stages, with the first stage being the very process by which participants of first days structured conversations exchange knowledge with one another. The second stage could then comprise a discussion on the form and delivery of strategic documents with a mind
to influencing key figureheads in influential policy circles. The third stage could be participation in a public forum, wherein the opportunity to relay information in presentation form, in addition to document form, would be available. The final stage could be to develop a web platform through which all the previous could be gathered to accompany streaming audio and video podcasts posted in open access format online.

3.12. Discussion and analysis

This chapter set out to examine my strategic response to climate change in the political economic context of Scotland, utilizing the SGRF as a catalyst. I also aimed to shed light on how the political economic dimensions of climate change can affect the practice of sustainable entrepreneurship, particularly concerning business strategy. On reflection, we can see from the case of the SGRF that sustainable entrepreneurs may face any number of often very difficult and highly important questions concerning strategy which can touch on multiple simultaneous aspects of sustainable venture creation from idea to execution. Critical political economy assumes the cooperation of a market-based system with a diversity of actors wielding asymmetric influence over its shape and direction. To pinpoint powerful actors in a market and to better understand their management structures and modes of influence can be advantageous for those who lack influence and more crucially access to the right networks and adequate resources for starting up a new sustainable venture. It is my view that the political economy of Scotland presented both an opportunity and a constraint on the founding members, who worked simultaneously to imbed themselves in a historical narrative based on a pre-existing model with slightly different aims and objectives, led by different people with different skills, capacities, and access to resources.

Sustainable venture creation can be seen as a dynamic process existing in a state of perpetual disequilibrium. Market intervention and reflections of power imbalances are not unique to the political economy of Scotland and therefore I expect to see similar activity in other organizing contexts outside Scotland. The extent to which a new sustainable venture is successful in capturing adequate market share, is fundamentally shaped by a corresponding impetus to tackle the problem of climate change. This added consideration which structures the business opportunity has significant implications for the practice of entrepreneurship, deserving of its own field of research. For sustainable entrepreneurs these questions concern not just the foundational aspects of sustainable venture creation, such as deciding on an incorporation structure, but also the effectiveness by which a new venture can address the challenge of climate change. There is thus a twofold pressure on sustainable entrepreneurs to generate revenue and to solve some aspect of climate change that is unique to their sub-culture and may not affect other entrepreneurial types. The result is that when it comes to strategy, the number of questions sustainable entrepreneurs face may amplify depending on the chosen market or product innovation at stake. This added complexity can affect the character or ordering of perceived strengths, weaknesses, opportunities, and threats that a founding individual or team must identify in order to manage. Perception of risk may
include, for example, frequency and immensity of severe weather events possibly affecting supply chains or the political risk of a rapid reaction altering the nature of a supportive tax regime or subsidization scheme. In the case of the SGRF, I considered the risk of inaction unacceptably high and thus market opportunities rife for exploration may be limited by the existential threat and an innate feeling of responsibility to commit one’s career to addressing climate change. The attitude of sustainable entrepreneurs in treating climate change with the same urgency as the need to generate revenue streams for their business, serves as both a constraint and an opportunity to capitalize on future markets.

Building on inspiration taken from the success of the Edinburgh Conversations, the SGRF was designed to be a multi-stakeholder initiative, which sought to bring together representatives of six distinct Edinburgh-based organizations with various intersections shared across the public, private and third sector. The individuals comprising the SGRF shared diverse backgrounds covering a range of professional experiences and competencies in negotiations, project management, business innovation and civic affairs. Unlike the Edinburgh Conversations, this meant that the process of engagement stood to be more structured and guided by professional management practices informed by corporate and third sector organizations. This one key difference in design between the Edinburgh Conversations and the SGRF was of critical importance, affecting everything from revenue model to incorporation status. Views varied on whether the model should be for profit or not-for-profit, causing a schism that was detrimental to the SGRF ever finding solid footing. A final determination as to the revenue earning potential of the organization was never made and the body remained an unincorporated, work-in-progress until undergoing a transformation spearheaded separately by two of the five original founding members. As this concluding analysis shows, while the SGRF was ultimately transformed into an exclusively private sector initiative called ‘the Green Investment Forum (GIF),’ the lack of consensus amongst the founding participants to reach a decision on the for profit or non-profit organizational structure was ultimately the cause of it failing to deliver a proof of concept.
Chapter 4: Case Study II: Sustainable Community Energy Network (SCENE) (2010-2014)

I have included elements of this second case study chapter in a stand-alone draft paper submitted to the Sustainability, Ethics & Entrepreneurship Conference in San Juan, Puerto Rico from March 3-5, 2023. I will obtain Open Access permissions following any offer to publish the completed work, prior to publication.

4.1. Background

As an academic researcher of energy politics as well as a sustainable entrepreneur, the prospect of locally owned sustainable energy has always seemed to me to be an ideal approach to addressing all three aspects of the ‘energy trilemma’ with one elegant solution. The energy trilemma as defined by the World Energy Council (2017) frames energy security as fundamentally interrelated with energy equity (i.e., affordability) and environmental sustainability. When the energy system is viewed holistically to account for the costs of prolonged fossil fuel use borne by society and the environment, the urgent need for a global transition to RE sources becomes abundantly clear. Currently around 70% of greenhouse gas emissions (GHGs) come from industry-intensive processes such as resource extraction, refining and manufacturing (Reinaud 2009). These large-scale industrial processes are the hallmark of modern state development, and it is no mystery why governments around the world play a guiding role in securing critical resources for the sake of their national interest. But climate change, as well as the destruction of our natural environment, poses a problem for this resource-intensive development pathway and it is one that cannot be resolved through the further expansion of industry intensive growth.

The question of how to solve the energy trilemma has been one of my foremost obsessions since I first encountered The Prize: the Epic Quest for Oil, Money & Power by Daniel Yergin around 2008, the year that the second edition was released. The book is well known to any student of energy politics and has earned its reputation as both an entertaining and comprehensive history which traces the evolution of the fossil fuel industry from the discovery of oil in the mid-19th century to its transformation into a transportation fuel source and staple commodity. Oil is truly the master resource. It is used to produce everyday consumer goods from cosmetics and cleaning products to plastics and fertilizers. Our modern way of life from medical care and high-speed travel to information technology would not exist without oil. With no shortage of action and adventure, the book catalogues in intricate detail the extreme lengths which pioneering entrepreneurs such as the Rothschilds and Rockefellers went to so that they might earn their place in the hierarchy of the great oil barons. Yet the co-evolution of the modern state and the globalization of oil markets as well as big industry has come at a great cost to our society and our environment. Fossil fuels are also finite and while the hysteria around ‘peak oil’ that was once in vogue in the early 2000s has since resided due to the rebirth of hydraulic fracturing for shale oil and gas in the US, it remains the case that one day, fossil fuel resources will go the way of the dinosaurs.
As a resource that is territorially affixed within national borders, oil and gas can become a cause for conflict. The distinctly territorial aspect of oil and gas reserves can spawn geopolitical disputes involving a multitude of public and private players who earn their living at various points throughout the value chain and/or by protecting the national interest. Unlike solar and wind energy which are free, abundant, and derived from resources which are territorially neutral, oil and gas reserves require extraction methods that necessitate heavy intrusion into local landscapes. This territoriality inherent in the nature of fossil fuel resources can come into conflict with local ownership rights and identity politics of local populations and fan the flames of historical rivalries. When there is an accident or when waste by-products aren’t properly disposed of, toxic chemicals can invade ground water and be transported to areas outside the extraction zone. Downstream, where refineries convert raw materials into useable products, harmful pollution is pumped into the atmosphere, which in turn spreads overland in all directions and contributes to destabilizing our climate. When extraction is attempted in a conflict zone, added security measures must be taken to ensure that supplies are not interfered with. This is especially the case when oil and gas reserves are being targeted as part of the conflict or are themselves the cause of conflict. Modern militaries also depend heavily on cheap and reliable access to oil supplies to maintain their operational efficiency and preparedness. It is no wonder why the discovery of oil has gone together with some of the most violent episodes in modern history. From the foreign escapades of British and French colonial forces in the Middle East to the civil conflicts spawned by the discovery of new reserves in developing counties, the incredible rise of our modern civilization and our modern state system has wrought death and destruction in its wake. By contrast it is difficult to imagine anyone taking up arms over access to the sun or wind. The interesting thing about RE is that unlike energy produced from fossil fuels, it can be decentralized, and end-users can simultaneously become producers. Energy can be generated, owned and operated onsite, supplied and monitored directly by those utilizing it, possibly bringing about a transformation in the relationship between humanity and the natural environment.

During the exploratory or ‘ideation’ phase, which would eventually lead to the creation of the Sustainable Community Energy Network (SCENE), I recall having an important conversation with a fellow researcher from the University of St Andrews, Dr Julian Graef a former US Naval Officer specializing in Peace & Conflict Studies. It was a sunny, windy afternoon in October 2010. We had been hiking through the hills of Arthur’s Seat in Edinburgh, discussing international affairs. Julian had spent the better part of his PhD fieldwork in Liberia, carrying out research in cooperation with the Carter Center’s ‘Community Legal Advisor’ program. Having recently returned from Monrovia, he had a fresh perspective to share on the USAID-supported effort there to further institutional development throughout a nation rich in fossil fuels but plagued by corruption and ravaged by civil war (1989-2003). While abroad Julian had gained personal insight into the pitfalls of top-down approaches to liberal peacebuilding. On reflection, he had reached the conclusion that local empowerment was not only a moral imperative for distributing development aid, but a pragmatic and potentially transferable approach to a variety of complex challenges, including resource challenges. If individual leaders within communities could become champions of
useful knowledge and co-creators of change-making programs supported by outside experts, many of the failed practices associated with foreign intervention from above stood to be remedied. While the Community Legal Advisor program in Liberia was aimed at providing rural community leaders with free access to legal services covering a whole range of health- and human rights-related issues, Julian’s insight that practitioners at local-level with some outside support could solve problems more effectively than practitioners at state-level made a lasting impression on me. If providing legal services for local leaders could empower them to drive societal change, then could a similar approach be applied to solving the energy trilemma?

As Julian and I progressed from the park to the pub, I found that his passion for localism also resonated with my own progressive, libertarian sensibilities. Having grown up in the rural Fidalgo Island town of Anacortes, Washington I had experienced first-hand the dynamics of living in a small, isolated community where native tribes and Scandinavian diasporas regularly clashed over the distribution of commercial fishing and land ownership rights. As you head west across Memorial Highway Bridge connecting Fidalgo Island to the Skagit Valley, you encounter a beautiful blue stretch of sea water called ‘Padilla Bay.’ Then just beyond it, often clouding the horizon, you see thousands of metric tonnes of toxic smoke billowing daily into the atmosphere courtesy of the Andeavor Anacortes Refinery or what was formerly called the Shell Puget Sound Refinery. The Andeavor refinery is the 52nd largest of its kind in the US and is one of the main employers for Anacortes, a town of around 16,000 people. At the time of writing, the Swinomish Indian Tribal Community with a population of 2,600 is considering issuing a legal challenge to the Skagit County authorities claiming that the March Point territory on which the Andeavor Anacortes Refinery sits is in fact illegally confiscated tribal land. These are problems with their own distinct identities, histories and complexities – problems that ultimately are better resolved by local leaders and the communities that stand to be impacted most greatly by any significant changes to the status quo. I couldn’t imagine a foreign aid force from Liberia being deployed to our region with its own band of legal bureaucrats and academic specialists striving to impose their view of what a positive outcome might be for our benefit on matters where they had little to no direct involvement. That approach would likely be unwelcomed by all parties. But if, hypothetically speaking, this same Liberian force were to be invited by tribal leaders to share useful knowledge based on their experience as well as access to legal funding to support their land reform agenda, such efforts however unlikely might be well received.

4.2. Context: the political economy of locally owned RE in Scotland

In Scotland, a nation with historically high concentrations of land ownership, local communities have been facing off against landowning elites for control over resources for centuries. Approximately 1,500 landholdings account for nearly 70% of all land ownership in Scotland (Wightman 1996). An antiquated law of succession, echoing pre-capitalist feudalism persists today, with the larger landed estates and the ownership of much of rural Scotland held by trusts and private companies. These ownership structures are, in a sense, immortal landowners as far as succession law is concerned; a fact that has driven some local citizens to challenge Scottish
succession law in the courts (Scottish Government, 2003). As the initial concepts for SCENE were beginning to crystallize in my mind, the realization that Scotland was home to such an extraordinary concentration of land wealth naturally inspired me to think about how this power imbalance may affect the potential to decarbonize the UK’s energy system. In addition to land resources, energy resources have held a prominent place in the political economy of Scotland since the early-1970s when massive offshore oil reserves were discovered in the North Sea (BBC 2005). After a failed campaign to claim the right of extraction exclusively for the Scottish people, the ruling Scottish Nationalist Party turned their attention toward wind, wave and tidal resources with equal ambition. Yet most of the benefits of large-scale energy production from offshore wind and onshore wind farms, remained in the hands of a small number of private companies and their shareholders. The Crown Estate and the Church of England, two of the UK’s largest single landowning entities, also stood to benefit disproportionately from these larger-scale developments, leaving local communities out of the equation. The opportunity seemed rife to level the playing field with a disruptive business model that could accelerate the deployment of local scale RE projects and to address the energy trilemma.

That evening I returned to my apartment in Edinburgh and drew up a proposal for a new type of network, one which would enable local organizations to connect with one another, share case studies about sustainability and access project funding from private sources. The tentative name for the network was, ‘Inter-City Advocates for Rural & Urban Sustainability.’ My first attempt at a mission statement was as follows, “Companies want to invest in sustainable designs and RE. But a lack of local involvement in the planning process creates a high-risk disincentive for what may otherwise be good projects. Alleviating the burden of added risk involves showcasing successful models, which have been successfully tried and tested in similar policy environments (Bruner, 13 Oct. 2010).” It was a good start. But several questions required further research: what was the appetite for private investors to invest in smaller scale RE projects? Was there adequate demand for private capital among local organizations? Would local organizations in Scotland trust a new venture to provide them with access to financial support and resources if that organization wasn’t led by a Scot? What was the size of the addressable market? Was there any competition? How would the venture make money? In addition to these questions, there was also the problem of my chosen name. As an acronym, ‘Inter-City Advocates for Rural & Urban Sustainability’ spelled ‘ICARUS.’ This was not exactly the positive signal of imminent success I wanted to send to the market. I decided to sleep on it and the next morning, a new name came to mind, the ‘Sustainable Community Energy Network’ or ‘SCENE.’

The creation of SCENE was in part shaped by the Scottish Government’s ‘Low Carbon Economic Strategy (2010)’ which aimed to deliver a system-wide low carbon transition that to-date remains ambitious among UK regions and globally. During the 2009-2013 period, the Scottish Government pledged to surpass targets set by the UK Government to meet 15 percent of electricity demand from renewable sources by 2020, with a target to meet 100 percent of electricity demand from renewable sources by 2020 (Scottish Government 2011). At the local scale the Scottish
Government had ambitions to follow the example of its European counterparts in Denmark and Germany, each with relatively high per capita levels of local RE ownership. The Scottish Government’s target of 500 MW of local RE by 2020, was modest by comparison and a reflection of the absence of local ownership over much of the Scottish territory (Respublica 2012). However, the policy framework did provide smaller-scale project developers with an opportunity to enter the market through applying for funding support and awards.

4.2.1. Community And Renewable Energy Scheme (CARES)

Together with the help of third sector organizations, such as the Development Trusts Association Scotland, Community Energy Scotland (CES) and Climate Challenge Fund, the Scottish Government kicked off its local RE program with a pilot scheme which earmarked funding and early-stage loans totalling ~£47.7 million in for local projects. The Community & Renewable Energy Scheme (CARES), which specifically targeted the growth of locally owned renewables, was launched in 2009 and took the form of £13.7 million grant to be dispersed to qualifying community-based organizations (Bomberg & McEwen 2012). Applicants were invited to submit expressions of interest to the Scottish Government and funds were then administered by CES, an independent Scottish charity established in 2008 'to build confidence, resilience and wealth at community level in Scotland through sustainable energy development (CES 2012).'

Organizations needed to meet two basic criteria to be considered eligible for funding: (i) a non-profit legal structure such as a co-operative, development trust, housing association or charity and (ii) a compelling project proposal. Following an initial two-year pilot phase (2009-11) the CARES loan facility was increased to ~£23 million with a mandate to cover costs at the pre-consent, development stages of community led RE projects. This second iteration of CARES could be used to cover up to 90 percent of the costs of obtaining planning permission for a project of under 5 MW capacity with up to £150,000 available per project (CES 2012). If planning consent was granted by a local authority, then the loan would be repayable at 10% interest, typically over a 10-year horizon, but with some flexibility. If planning consent was denied, the loan would be written off by the Scottish Government (2011).

The CARES loan facility was an innovative, commercially motivated solution that helped the Scottish Government reach its 500 MW through direct support for sustainable entrepreneurs within Scottish communities (Scottish Government 2012). As well as administering the CARES loan and a host of other grant schemes, including the Big Lottery’s Growing Community Assets scheme and region-specific funds, CES played a role in assisting local organizations with guidance on application forms and the structure of project plans, with the aim of procuring successful bids. They also acted as liaison to regulators and local administrators tasked with reviewing grid connection applications and applications for planning consent. As the charitable organization responsible for screening CARES loan requests, the role of CES in providing commercial expertise to community organizations was somewhat limited in scope. The executive team were mostly former employees of Highlands & Islands Enterprise, a grant making organization with an emphasis on supporting locally led...
business initiatives in the mostly rural areas of northwest Scotland. The senior management team were not themselves experienced in RE project development, financing, or engineering. This left a gap in the market for a more commercially focussed enterprise to provide commercial services for CARES loan recipients such as the creation of business plans, financial modelling, cash flow management, scenario planning and investment memoranda as well as engaging with the private sector (Bruner, 1 Nov 2011).

4.2.2. Feed-in Tariffs

For a time, local organizations were able to take advantage of the UK Government’s Feed-in Tariff (FIT), which provided a per kilowatt hour (kWh) payment for electricity generated by renewable sources up to 5 MW. FITs were comprised of both (i) generation tariffs, paid to local-scale producers of RE and (ii) export tariffs, an additional rate for each unit of electricity exported back to the national grid. FITs were available for technologies which were certified by Ofgem, the UK’s energy regulator and were guaranteed for the lifetime of the technology warrantee.

<table>
<thead>
<tr>
<th>Description</th>
<th>Total Installed Capacity (kW)</th>
<th>Tariff (p/kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>New build solar photovoltaic</td>
<td>0.4</td>
<td>44.19</td>
</tr>
<tr>
<td>Retrofit solar photovoltaic</td>
<td>0.4</td>
<td>50.67</td>
</tr>
<tr>
<td>Standard solar photovoltaic</td>
<td>4-10</td>
<td>44.19</td>
</tr>
<tr>
<td></td>
<td>10-100</td>
<td>38.50</td>
</tr>
<tr>
<td></td>
<td>100-5000</td>
<td>35.95</td>
</tr>
<tr>
<td>Stand-alone solar photovoltaic</td>
<td>0-5000</td>
<td>35.95</td>
</tr>
<tr>
<td>Anaerobic digestion</td>
<td>0-500</td>
<td>14.17</td>
</tr>
<tr>
<td></td>
<td>500-5000</td>
<td>11.06</td>
</tr>
<tr>
<td>Combined Heat and Power</td>
<td>0-2</td>
<td>12.28</td>
</tr>
<tr>
<td>Hydro</td>
<td>0-15</td>
<td>24.44</td>
</tr>
<tr>
<td></td>
<td>15-100</td>
<td>21.87</td>
</tr>
<tr>
<td></td>
<td>100-2000</td>
<td>13.52</td>
</tr>
<tr>
<td></td>
<td>2000-5000</td>
<td>5.46</td>
</tr>
<tr>
<td>Wind</td>
<td>0-1.5</td>
<td>42.28</td>
</tr>
<tr>
<td></td>
<td>1.5-15</td>
<td>32.71</td>
</tr>
<tr>
<td></td>
<td>15-100</td>
<td>29.57</td>
</tr>
<tr>
<td></td>
<td>100-500</td>
<td>22.99</td>
</tr>
<tr>
<td></td>
<td>500-1500</td>
<td>11.60</td>
</tr>
<tr>
<td></td>
<td>1500-5000</td>
<td>5.46</td>
</tr>
</tbody>
</table>

*Table 2: Ofgem Feed-in Tariff Rates (1 April 2010 – 31 March 2011)*

However, this additional incentive available to non-profit organizations did not last as the European Commission would ultimately nullify the receipt of FITs in conjunction with CARES loans as a violation of *de minimus* State Aid rules (UK Government 2011). These rules create a ceiling for single organizations to receive public funding of £200,000 over a 3-year period. In the event that a non-profit organizations in receipt of CARES funding failed to secure planning permission and qualified for their loan to be written off, this write off as well would be counted under *de minimus* rules. Communities in receipt of CARES loans then had an additional need to source construction financing and to negotiate Power Purchase Agreements (PPAs) or ‘off-
take agreements,’ with corporate power providers as well as infrastructure funds. The high concentration of land ownership in Scotland also created a situation whereby many local organizations under consideration for government funding would often not own the site on which a project development was proposed. This placed local organizations in a difficult position which required them to not only obtain exclusivity to negotiate for access rights over a feasible project site, but also the support of a development company or team of engineering specialists with the requisite skills, experience and commercial knowledge required to reliably build, operate and maintain electricity-generating assets (Bruner, 1 Nov. 2011). Joint Ventures were encouraged by the Scottish Government following the European Commission’s ruling as a solution to continue to support the CARES loan facility (Respublica 2012). A Joint Venture between a non-profit and for-profit organization, for example would enable the non-profit organization to receive CARES support working in conjunction with a private sector power company or corporation. However, the decision-making structure of a co-operative, development trust or charity differs substantially from that of a commercial business, with the latter favouring efficiency over consensus and the former often lacking the benefit of experience in project development. This structural mismatch may explain why so few successful Joint Ventures were successfully carried out between non-profits and commercial businesses during the 2011-2013 period (Respublica 2012).

4.2.3. The UK Green Investment Bank

With the establishment of the UK Green Investment Bank (GIB) in 2012, the UK Government’s support for RE created a generally favourable environment for large-scale investments in offshore wind energy and onshore wind farms as well as commercial biomass, bioenergy, anaerobic digestion, and energy efficiency projects (NAO 2017). The GIB was assigned a ‘Green Impact Team’ and had a robust green impact agenda but lacked the equivalent social impact mandate and thus larger investments were mostly favoured over local investments throughout its tenure. In 2017 a consortium of private infrastructure funds, comprising Macquarie Group Limited (Macquarie), Macquarie European Infrastructure Fund 5 (MEIF5) and Universities Superannuation Scheme (USS) acquired the GIB for £2.3 billion (Macquarie 2017). Between the GIB’s launch in 2012 and the end of 2015, it invested £2.3 billion of public funds into 60 UK-based projects, with a total value of ~£10 billion. Of the net capital deployed, £9.4 million went toward three small-scale hydroelectric projects in the Scottish Highlands (NAO 2017). The GIB’s investment decision-making reflects the high entry barriers faced by all RE businesses, which make larger projects sponsored by established corporate entities more fundable compared to smaller opportunities. Local project developers often lack the benefit of a large balance sheet and in-house expertise needed to identify and manage project risks during the planning stages of a project without relying on external consultants, advisors and specialists each with their respective day rates. During the earliest stages of a project, when development work is being carried out to obtain planning permission, corporations benefit from having most of the engineering and finance expertise in-house. Access to government officials and influence over planning decisions are also key to ensuring that development work at risk translates into a
successful planning application and a reasonable grid connection date. This too favours larger companies. Whether large or small, development work is taken at the developers own risk, meaning that if planning permission is not secured or if a grid connection agreement cannot be obtained, the time and money spent putting together the various proposals to achieve both can result in financial losses. Commercial banks, operating under Basel II rules, must also maintain strict capital requirements when it comes to supporting infrastructure funds. Arguably these requirements impose restricts that prohibit early-stage financing of projects below a certain capacity threshold (e.g., 25 MW).

Access to private equity investment is not often an option for local organizations. The high-risk profile of a project seeking planning permission is the result of high transaction costs, resulting from a lack of in-house skills to complete the project lifecycle without external help. The risk of providing debt financing to local organizations, is generally perceived as too high to meet the rigid due diligence criteria of mainstream banks. Those organizations best placed to attract funding are those which can draw on other non-financial resources such as professional connections and access to networks of decision-makers. High-risk at early-stage for <5 MW projects means the predominant form of financing available to local organizations must often take the form of public grants. Yet at the time of SCENE’s creation the opportunity for local scale project development in terms of available capacity was immense. A significant volume of <5 MW hydro and wind power projects across Scotland provided a swathe of attractive business opportunities. When I started doing market research to investigate the opportunity further, I discovered 1,200MW of untapped hydro energy potential (SAC Consulting, 2010), spread across the country, mostly concentrated in the upland territories of the Highlands, including Orkney, Shetland and Hebrides islands. A 2011 report by the Energy Savings Trust found 127 MW of locally owned energy was already operational throughout Scotland, meaning that the Scottish Government needed to deliver a minimum of 373 MW by 2020 in order to meet its policy goals. Despite the relatively low uptake, a 2010 report by the Scottish Agricultural College and CES concluded that if risks could be reduced, the actual potential of local scale energy was in fact much higher than the 500MW target set by the government (SAC Consulting, 2010). The trend toward increased generation was also clear. At the end of 2011, there were 4,796 MW of installed renewables electricity capacity in Scotland, an increase of 9.5 percent (416 MW) from 2010. Renewable electricity generation in 2011 reached a record high at 13,750 Gigawatt hours (GWh), which was an increase of 44.5 percent on 2010. Around 35 percent of Scotland’s electricity came from renewables in 2011, exceeding the Scottish Government’s target of 31 percent for that year. Scotland contributed almost 40 percent of the UK’s renewables output in 2011 (Scottish Government, 2012). Each of these factors combined to create an opportunity to develop a business which could provide commercial advice and access to early-stage investments for local organizations and local businesses.
4.3. Market overview

The market gap for helping local organizations and businesses develop and source private capital for <5 MW projects widened when the European Commission ruled that CARES loans recipients would not be eligible for FITs. The impact on the local scale RE market in Scotland was threefold: (i) the projected internal rate of return (IRR) for a <5MW wind or hydro installation funded by a CARES loan would fall by ~4-6 percent (ii) as a result of the projected fall in IRR, community organizations in receipt of CARES loans would find it difficult to attract capital even after securing planning permission (iii) local for-profit businesses ineligible for CARES loans could still benefit from FITs and thus remained attractive potential customers. Market research showed that with the support of FITs small-scale hydro and wind projects in the 250 kW – 1.5 MW range could generate an IRR of ~12-18 percent for early-stage equity investors if an effective commercial solution could be found (Bruner, 28 Nov. 2011). These projections were based on my own modelling of potential projects, and the ability to secure this level of return still required a proof of concept. A successful commercial solution would in turn help to address the energy trilemma, by accelerating the pace of local RE development and thus providing a source of clean, affordable, secure electricity for every customer.

4.3.1. Seed Enterprise Investment Scheme (SEIS) and Enterprise Investment Scheme (EIS)

There was an additional opportunity for private limited companies with share capital to qualify for the Seed Enterprise Investment Scheme (SEIS) or Enterprise Investment Scheme (EIS). SEIS Relief and EIS Tax Relief was a UK Government incentive designed to encourage risk-taking by private High Net Worth Individuals (HNWIs) investing in early-stage businesses. Under both schemes, companies which had been actively trading for less than two years could provide up to a 50 percent discount for investors against their annual income tax. As it pertained to RE projects, if the structure of organization was a company limited by shares, this share capital could then be sold to investors as project equity which in turn would qualify for additional tax relief on the secondary market:

- **SEIS Relief**: Income Tax Relief at 50% for investments up to £150,000 in qualifying Companies (£100,000 per Investor per year);

- **EIS Relief**: Income Tax Relief at 30% for investments of up to £5 million per Company (£1 million per Investor per year).

The limited company model or ‘Energy Service Company (ESCO)’ model is a common commercial vehicle for financing projects in the built environment. ESCOs are a universally recognized vehicle that can also be adapted to reflect different stages of risk in a project’s lifecycle which is reflected in the ‘pre-money’ and ‘post-money’ asset valuation (RETD, 2012). It was an early determination of mine that ESCOs could perhaps be considered eligible for SEIS and EIS Tax Relief as well as FITs. Unlike the CARES loan facility, which was rendered ineligible for FITs on account of *de minimus*
European State Aid Rules, SEIS and EIS were not a form of direct payment from a public source and favoured private participation in the market. The combination of SEIS and EIS Tax Relief with FITs could offer the perfect solution to attracting private equity investment from individual investors into early-stage stage projects, de-risking the project investment and offering an additional upside from the sale of electricity once a project was operational. Furthermore, gains arising from the sale of shares in a qualifying SEIS or EIS company would be exempt from Capital Gains Tax (CGT) if held for the qualifying period of three years from the date of the investment (UK Government 2017).

<table>
<thead>
<tr>
<th>INVESTOR ASPECTS</th>
<th>SEIS</th>
<th>EIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investor limit</td>
<td>£100,000 p/a</td>
<td>£1,000,000 p/a</td>
</tr>
<tr>
<td>Income Tax relief</td>
<td>50%</td>
<td>30%</td>
</tr>
<tr>
<td>CGT Exemption?</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>CGT Reinvestment Relief?</td>
<td>50% Exemption 2013/14</td>
<td>Deferral</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COMPANY ASPECTS</th>
<th>SEIS</th>
<th>EIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment limit</td>
<td>£150,000 total</td>
<td>£5,000,000 p/a</td>
</tr>
<tr>
<td>Gross Assets</td>
<td>&lt; £200,000</td>
<td>&lt; £15m</td>
</tr>
<tr>
<td>Employees</td>
<td>≤ 25</td>
<td>≤ 260</td>
</tr>
</tbody>
</table>

*Table 2.1: Summary of SEIS/ EIS Incentive*

Investors would also be able to access the secondary market, where projects could potentially be acquired by later-stage infrastructure funds or pension funds once a project was operational and generating electricity. The opportunity to produce a capital value for local RE projects on the secondary market thus arose through (Bruner, 28 Nov 2011):

- *the sale of future electricity to utility providers who need to develop RE sources*
- *the sale of future electricity to major energy users who need to secure lower cost energy sources*
- *the sale of future income flows to financial institutions, such as pension funds*

In terms of scale the opportunity also meant that SCENE may be able to help facilitate direct financing from individual HNWIs into locally owned RE projects. This novel solution to the energy trilemma would, if successful, demonstrate that sustainable energy could be delivered equitably with local partners as project shareholders, with minimum environmental intrusion into the natural landscape.

4.4. Building the network

The market opportunity was convincing enough that I began to search the web for
evidence of competition. Beyond CES, whose primary focus was on non-profit, community-led initiatives and in administering CARES loans, I could not identify a commercial organization in Scotland specializing in assisting local businesses with investment readiness and raising private capital for RE projects. There was an array of development companies with track records in delivering wind power and hydro power in the target range as well as specialists, consultants and advisors offering services across the value chain. These could be leveraged to join the network in a complementary fashion, I supposed. Although that proved to be more difficult to execute than initially envisioned, largely due to incumbent attitudes toward new entrants and a sceptical attitude of local organizations toward commercially driven initiatives.

The search for a network of experts and potential business partners who might assist me with refining my value proposition led me to the University of Edinburgh Business School where I had been earning a living as a teaching assistant and part-time lecturer for the Carbon Finance MSc program. Through this program, the Business School actively encouraged collaboration between MBA students and private companies as part of their thesis research. But it was unclear how an aspiring entrepreneur might go about engaging the Business School in the search for an adviser, co-founder or multiple co-founders. Unlike private companies with established brands and track records, a new venture concept merely exists on paper or often only within the founder's imagination. Transforming an idea into a business without funding, partners or financial resources would require some creativity, persistence and will power. I decided to create a logo and establish the early makings of a brand concept that could provide my business idea with some credibility and could be attached to emails and other briefings and correspondence about the SCENE concept:

![SCENE logo](image)

Figure 3: SCENE logo

I imagined that the choice of the term ‘community’ in the title would help to encapsulate the great diversity of local organizations and businesses operating at local scale in Scotland. It would also send a positive message to public and third sector organizations that SCENE was supportive of the wider social and environmental impacts which local scale RE projects stood to make in helping the Scottish government to fulfil its Low Carbon Economic Strategy as well as addressing
the energy trilemma. Once a logo had been decided upon, I proceeded to approach some of my colleagues in the Business School to seek advice on structuring an internship around the proposed business concept. I would ideally need to attract some likeminded sustainable entrepreneurs with the relevant market knowledge and expertise to assist in co-developing the business. The Carbon Finance MSc as well as some other programs in the School of Geosciences had a good reputation for being attractive to professionals with real world experience in energy markets. So, I outlined some basic ideas about how the SCENE business model could operate and then sent a call for interns to some of my more senior colleagues in the Business School who were kind enough to circulate the call to various email lists.

The call for interns had a modest response rate. About eight postgraduate students replied, some with professional experience working in RE and/or sustainability. I decided to interview all eight applicants and was particularly impressed by two of the candidates whose CVs included engineering and energy systems expertise. These two individuals also made a personal impression on me with their strong communication skills and keen interest in entrepreneurism. During interviews they seemed to enjoy solving some of the problems I proposed while attempting on the spot to come up with creative solutions to some of the financing challenges facing the local RE market in Scotland. This attitude seemed to me, evidence that they would be willing to accept responsibility for solving problems dynamically, as they arose. This dynamic problem-solving capability and passion is a cornerstone of entrepreneurial thinking. The main challenge I proposed was one of building a network with an online platform that would serve the aims of (i) hosting case studies of local projects that were successful so that organizations could share knowledge freely with one another and (ii) enabling local project promoters to contact a team of experts who could in turn provide consultancy services around engaging private capital and general business readiness (iii) tracking and managing customers (Bruner 28 Nov 2011).

I was fortunate to convince postgraduates Vijay Bhopal and Huw Thomas to assist with developing SCENE as early co-founders. In return we agreed that they would share in some of the responsibility of co-creating a workable commercial model as well as formulating a plan and devising a strategy of execution. One particular challenge which the four of us were keen to rapidly resolve would be the one of building market credibility with very limited resources. There were many Scottish organizations in the private sector and third sector already servicing the local RE market. If we were to have any chance of success, we would need to find an appropriate revenue model that filled the market gaps which I had identified, build early brand recognition, offer a compelling and clear value proposition and adequately differentiate our offer. In the past I had some success in attracting expertise and funding support through organizing a thematic event (Bruner 16 Nov 2010). Vijay and Huw agreed that this approach could help to raise SCENE’s profile. I went to work drafting a sample program for an investment forum to be hosted on the University of Edinburgh campus. I then circulated the draft to some potentially supportive campus organizations. After a few weeks of emailing and following up with face-to-face meetings, the Public Policy Network (PPN) offered to provide us with a venue,
catering and a marketing budget. The Climate Challenge Fund agreed to cover modest overheads for coordinating the event. We called this event the ‘Sustainable Community Energy Investment Forum.’ Once a funding commitment was firm, Huw, Vijay and I went about creating a proposed guest list and reaching out to potential guest speakers. I offered myself as a chair for one of the panel sessions under the title, ‘Co-founder & Managing Director’ of SCENE. Strategically this would help to demonstrate subject matter expertise and to highlight our aim of empowering local organizations with business advisory services. We then went about coordinating logistics and sending out targeted invites to a list of local experts who we had identified who may be willing to speak or chair a panel session on local sustainable energy themes (Bruner, 18 Oct 2011). These were:

(i) Business loans and accessing private investment  
(ii) Local empowerment and social justice  
(iii) Legal advice and support  
(iv) Show stoppers and regulatory hurdles  
(v) Public support and legislation

4.5. Formulating a plan and devising a strategy

On Thursday, 6th October 2011 SCENE, with the support of the Climate Challenge Fund and Public Policy Network (PPN), invited community stakeholders and investors to take part in the First Annual 'Sustainable Community Energy Investment Forum' held at the University of Edinburgh. The Forum’s principal aim was to provide a comfortable space for local leaders to share their experiences in trying to make RE projects work at a grassroots level. Our team strategically sought out key players across sectors in an effort to bring representatives from banking, legal, consultancy and utilities services together with local non-profit services providers, civil servants, academics and advisors. Approximately 80 participants were counted on the day.

Confirmed speakers were as follows:

- Jan Bebbington, Professor of Accounting and Sustainable Development at the University of St Andrews  
- Andrew Kerr, Director of the Edinburgh Centre for Carbon Innovation  
- Georgy Davis, Development Manager at Community Energy Scotland  
- Steve Moore, Relationship Manager at Triodos Bank  
- Justin Kennick & Tom Black, Co-founders of Portobello Transition Town  
- Nicola McEwen, Professor of Territorial Politics at the University of Edinburgh  
- Phillip Bruner, Co-founder & Managing Director, SCENE

The event was well attended and helped to raise the profile of SCENE with some of our potential target customers. From our collective notetaking we also captured market intelligence in each of the topical areas explored. Key learnings from the event which were formative in SCENE’s ongoing development are summarized as follows (Bruner, 18 Oct 2011):
Local leaders involved in RE faced difficult choices in deciding who to partner with from the private sector and how best to structure their assets in order to protect their interests. The pressure to deliver a bankable model within an acceptable time frame was significant, given that local organizations often rely on outside support in terms of advice and expertise from the Scottish Government and third sector. Loans on offer from both public and private sources were often sought during the high-risk, planning stages of development and, if awarded, could provide local entrepreneurs with a steady foundation for taking a project forward. It was well known that legal and regulatory barriers as well as communication gaps could hinder progress during these early stages and added costs incurred through seeking professional guidance could rapidly accumulate if project managers are not adequately prepared to negotiate or make use of the guidance on offer.

The question of how best to structure and manage local RE projects presented few simple answers. From the legal perspective, there was a need to provide bespoke services to local organizations that can cater to project specificities. Myriad factors in terms of location, logistics, history, relationships with land and estate owners, relationships with private sector players and neighbours can impact upon the type of legal advice given and/or the extent to which legal practitioners or consultants need to get involved. Complexity and diversity in advice on legal matters was seen as a challenge by local leaders and a potentially risky process given the amount of time and money that often must be invested in order to develop a project. There were also some differences in opinion concerning how best to tailor a local project to meet funder requirements.

In terms of developing a bankable model, having a legal structure provided a collective sense of purpose, empowered local entrepreneurs with a sense of confidence and demonstrated to investors that the organization was commercially minded. Drawing on the experiences of other local organizations further along in the process could help to aid in capacity building through shared learning of best practices. Many shared the view that learning could be standardized and brought up-to-speed to better cope with funder requirements. Project managers expressed concerns about transfer of ownership over long periods, e.g. after FITs have expired, as well as difficulties in deciding how best to maintain renewable sources in cases where a project is locally owned outright. Legal experts offered the recommendation that a ‘perpetual right to renew’ be included in partnership agreements or JVs with asset owners.

The need to develop an investment agreement in order to suit developer and funder requirements simultaneously was recognized by all as critical to a project’s success. Given that the primary concern of funders is to assess risk and to guarantee Return on Investment (ROI), it is essential that local organizations can offer investment securities. Development trusts can reassure investors for the longer term and given that Trustees are duty
bound under their Articles of Association. Revenue Partnership Agreements (RPAs) were suggested as an innovative means of structuring local projects in cases where local organizations sought competitive returns from increased ownership over FITs after planning permission had been obtained.

(v) Participants suggested that ESCOs could provide some stability for brokering strong partnerships between local organizations, services providers and funders. ESCOs encourage the private sector to operate efficiently, through specific incentives built-in to performance contracting, or JVs supporting commercial utility activities in this area. ESCOs are generally companies which are financed through performance contracting, for example where the electricity generated can be modelled as a future cash flow which in turn pays for the installation of the equipment plus margin.

These learnings as well as the many conversations which were had between our team and participants provided us with the market intelligence we sought to help validate and refine our business case. Overall, the event also helped us to build some brand credibility for SCENE. In addition, an unexpected approach from a senior partner in a commercial law firm would later provide an instrumental partnership for securing the internal investment we would ultimately need to roll out a series of local RE projects in Scotland, with mixed success.

4.6. Statement of purpose

With a team of three dedicated co-founders and sufficient market research as well as primary data to support our assumptions, we proceeded to incorporate the business and to draw up an initial business plan and service model. Our business plan consisted of the following key aims and objectives, based on our recently gathered market intelligence and conversations with prospective customers and partners who took part in our event:

(i) SCENE will capitalize on opportunities in secure markets by linking up energy investors with local leaders at every stage of development. We will offer local organizations and businesses diversified access to financing options, planning and marketing support as well as a social network for exchanging knowledge on best practices. We will offer investors streamlined access to local scale, bankable projects, championed by qualified professionals and supported by government-backed FITs. Projected returns on investment are in the 10-18% range for small-scale hydro and wind power projects.

(ii) SCENE’s will support customers seeking to get ‘investor-ready’ and to enter into contractual agreements with investors. Our engagement strategy, backed by leading-edge research, will allow us to filter out and/or challenge potentially unfriendly political environments, avoid bureaucratic hurdles and maximize options for commercial ventures. Our primary aim is
to bring forward a pipeline of 20 local RE projects in our first year of operation. In doing so we will aim to cut down on lengthy delivery timescales and to help to ensure higher rates of ROI.

(iii) Local organizations can be hard to define, but for those who are interested in generating revenue from RE ownership, they must share some identifiable characteristics. First of all, they must have a legal structure. A legal structure can be anything from a co-operative to a development trust or a limited company, i.e. any incorporated body that is capable of entering into legal agreements. Local leaders must also have a desire to manage their own energy supplies. While individuals often have different motivations for devoting time and resources to a project, their aim must be to gain empowerment through energy ownership. A shared sense of responsibility for bringing a project forward, backed by a willingness to do what it takes to see a project through from conception to completion are both prerequisites for achieving win-wins.

(iv) Finally, RE projects need exceptional leaders. Whether a local organization is defined by a history of living together in a shared space or a legacy of working together to achieve common goals, dedicated teams must already be in place in order to enter into serious discussions with private sector investors. Leaders with the motivation, skills and know-how to show initiative is essential for building healthy and lasting partnerships with the private sector.

4.7. Service line and revenue model

The Scottish capital market was typified by a substantial number of HNWIs and ‘Angel Investors’ who could make small-scale investments work, rather than venture capital or private equity funds who prefer to back larger projects. SEIS and EIS Tax Reliefs, coupled with FITs were an attractive mechanism for encouraging investment at local scale in spite of the high-risk levels associated with local-scale projects. Our early projections showed that FITs when combined with SEIS or EIS Tax Reliefs, could generate double the returns for investors on <5MW hydro and wind projects amounting to ~20-36 percent IRR per project. The commercial service we aimed to provide was to then identify, assist and provide access to early-stage equity investments for the development and fulfilment of small-scale generation projects managed by local organizations.

Our revenue model would be to earn fees from consultancy in assisting local organizations with getting their project plans in order. These fees would be earned at a market rate for typical consultants in the RE market, which was in the £500-£800 per person day range. Complementary to this, we identified an opportunity to take a introductory fee percentage on the equity investment which we would help to source in cooperation with partners still to-be-identified. This fee would be 5 percent on the total amount of equity invested per project. Revenue would be brought forward according to the following service line:
• **Matching local projects with equity investors**: local organizations that are ready to engage with the private sector are often faced with having to make difficult decisions about which private sector partners to engage with at various project stages. SCENE will simplify this process by working together with experienced partners and by building bespoke consortia that can offer tailored solutions at the early stages of project development.

• **Business plan creation and cash flow modelling**: local projects can benefit from having a helping hand assist with tailoring project plans and cash flows to an investor audience. SCENE will support early-stage projects with commercial readiness at half the cost of a corporate services provider.

• **Managing relationships**: once we identify a bankable local project, SCENE will help to manage communications between investors and project managers. The process from conception to completion can be a trying one, but with our consortium-based approach, SCENE can provide one-stop access to all the right players at each development stage, allowing for more efficient project delivery at shorter time scales.

• **Reporting on progress**: SCENE keeps in touch with community champions throughout the development process – providing progress reports and tracking developments for investors so that they don’t have to. This allows investors to stay abreast of only the most essential data, while giving communities the added support they need for seeing a project through to completion.

4.8. Minimum Viable Product

Given that one of SCENE’s primary aims was to help local organizations attract early-stage funding through the facilitation of partnerships with private investors, we initially contracted some independent research work to see if a web portal or software platform might efficiently support such a service (SCENE Connect Report, 06/07/12). My initial thoughts were that a user-friendly interface with a map of opportunities, as well as a knowledge store detailing successful project case studies, would help to promote the sector generally, as well as smoothen information flow between the various stakeholders and in doing so, reduce friction in the project due diligence process. If it worked, this software platform could satisfy our ambition to potentially build a social network that would be active initially in Scotland, but then could perhaps grow to attract local organizations in England, Wales, Northern Ireland and beyond. Takeaways from our Sustainable Community Energy Investment Forum had provided some objective data from our target clients, that helped to validate our hypothesis that there would be sufficient demand for an intermediary or match-making service of this kind. Still, there were no concrete suggestions captured in the report about what form this type of platform could take; should it be online or not? While there was little doubt about private investors’ demand for robust market information that could be used for making investment decisions, it remained to be seen if local organizations, especially those in more remote, less served locations, would be willing
to create profiles and share access to their project information through an online social network.

In order to investigate the potential to create this social network, I used some of the funding we had secured from the ECCI to commission a survey to be carried out by an academic researcher. The researcher was tasked with first creating a database of all the local organizations in Scotland involved in the RE sector. Next, the researcher would devise a questionnaire and carry out a survey targeting local organizers to see if firstly, a match-making service to source funding from private sector partners would be of value and secondly, if they would be willing to share their project information with private investors through an online portal. In tandem our team would set about collecting and mapping local RE project information from online research that could be entered into the database to complement and cross-analyze the data collected from the survey responses. The type of project-level information included in both the questionnaire and in our online research included the names and websites of the local organizations involved in RE project planning and development, the structure of organization, names and contact details for each organization’s leadership team and any available project-level information (e.g., location, technology-type, commissioning date, partnerships, funding sources).

The survey was carried out from December to March 2012. On completion the results from the survey successfully diagnosed 97 out of 314 locally led RE projects targeted. Of these nearly 36% of responders, representing approximately 180 MW in production capacity, were actively seeking early-stage access to funding. This represented a market demand for ~£145m in total funding. Beyond the survey, our online research conducted in tandem had identified a total of ~1,200 local organizations that were active in the Scottish RE sector. The geographic distribution of the projects we were able to map, mostly favoured the rural Highlands and Islands of the Scottish territory:

Figure 3.1: SCENE local energy project survey responses
With some market validation in-place, I developed a preliminary roadmap for an online portal that could further our data collection and match-making service, which was initially called ‘SCENE Connect.’ A placeholder with banner and launch timeframe was added to our evolving website:

![Figure 3.2: Landing page featuring SCENE Connect](image)

4.9. Partnerships and funding

With a team, brand, business plan and revenue model in place, we set out to build some key partnerships that would help us to hone our value proposition and chart our route to market. The Edinburgh Centre for Carbon Innovation (ECCI) provided us with office facilities and some early funding to create a local energy database of projects, which could be converted to a Customer Relationship Management (CRM) platform. The database would also enable us to map areas of high project concentration and to develop a more granular view of project types, including technology choices, suppliers, business models, stages of operation, capacity and other Key Performance Indicators (KPIs). Funding from the ECCI further allowed us to begin to prototype our interactive web portal, which we envisioned we might use to highlight successful examples of local case studies and to market our services to local organizations. After some initial trial and error in marketing services to customers through cold calling and network utilization, we were fortunate to secure a development partner in ‘Sustainable Heat & Power Ltd. (SHPL).’ The introduction
came from a partner in a local law firm who had been a participant during our forum event. SHPL was a turnkey project development company, specializing in the local RE and sustainable heating market. They had been seeking a marketing and business development channel to accelerate and broaden access to prospective customers in the local-scale Scottish RE market. Their partnership provided us with some leverage for expanding our service suite to include:

- Initial diligence and project feasibility
- Securing planning permissions and environmental consents
- Negotiating upgrades and enhancements to grid connection facilities
- Legal and contractual obligations
- Equipment selection and purchase
- Project management of installation and operation of small-scale hydro and wind power

Partnerships with the ECCI, a commercial law firm and SHPL bolstered our business case and allowed us to learn a great deal about the development process from a roundtable of experienced professionals who had worked throughout the RE value chain in areas such as legal services, project finance, environmental planning, technical feasibility, equipment installation, operation, and maintenance. With the support of SHPL, our combined business case ultimately attracted the support of an individual HNWI who invested adequate working capital into SCENE and SHPL collectively to cover one year of operating expenses across the core team. The investment was qualified under the SEIS Tax Relief incentive. Working capital gave our team the resources we had long sought to formalize the business and to professionalize our services offer. The result was a mixed outcome for the SCENE-end of the business with some projects coming to fruition and others falling by the wayside.

4.10. Outputs

The following summaries provide a sample of the projects that SCENE originated during its time operating as a commercial business with the help of SHPL. SCENE has since gone on to become a social enterprise and continues to develop projects in the local RE market, as well as ICT product innovation in the UK and international markets:

Stewart Energy: SCENE worked with Lesmahagow Development Trust (LDT) to acquire an equity stake in a farm-based wind power project. SCENE supported LDT’s efforts by managing stakeholders, offering financial assistance and cash flow modelling, as well as drawing up a business plan on behalf of the Trust. The Scottish Government’s RE Investment Fund through CARES financed the 25% community stake in the 2.5MW development.

Bandirran Wind Farm: SCENE were commissioned in 2014 by a Perthshire-based community organization to assess and plan for a potential acquisition of a large-scale wind energy development. SCENE brought together and managed the project.
consortium and worked towards a buyout of the windfarm, which was owned by a corporate developer. This project had the potential to found one of the largest community renewables developments in the UK, but unfortunately was cancelled due to technical and planning complications arising from the site.

JHI Post-Carbon Farm Demonstrator: The James Hutton Institute (JHI) has a vision for Hartwood to become a potential model for a Scottish post-carbon farm. This will be achieved through the development of RE production to support sustainable farming on the site. As head of the project team, assessing the viability of the site and technological options, SCENE provided key technical services from feasibility assessment to stakeholder engagement. The project includes multiple potential RE technologies, such as mine-water driven geothermal district heating, anaerobic digestion, wind and solar generation.

Towards Resilience: Off-Grid Community Energy in Odisha: Towards Resilience was funded by the Scottish Government International Development Small Grants Program and focussed on identifying and overcoming end-of-life problems related to RE technology deployed in the state of Odisha, Northeast India through the development of an information gateway. The project has developed into Urjaa Samadhan, an Indian social enterprise that uses the technology developed in the project, an integrated ICT solution for improving last mile delivery on materials and services to off-grid users.

4.11. Discussion and analysis

The Scottish Government’s Low Carbon Economic Strategy and support for local RE projects in the Scottish territory created a resource rich environment for SCENE to enter into the local RE market. While financing for RE at early-stage remains a challenge for projects that are below the threshold of mainstream lenders, the combination of the CARES loan scheme and the UK Government’s SEIS and EIS tax incentives, fostered the growth of a highly innovative and commercially driven industry that for a time, attracted private investment for local organizations developing RE. In spite of European State Aid rules ultimately coming into conflict with the combination of government-sponsored loans and relief from capital gains for private investors, the falling costs of RE and the generally supportive policy framework for local-scale RE projects in Scotland resulted in the ongoing prosperity of the market. Yet the experience of creating SCENE was not without its challenges. The historical context of Scotland and the particularly territorial nature of Scotland’s political economy meant that local as well as some Scottish Government-led organizations had adopted a proprietary attitude toward their customer base, making it difficult for SCENE to scale its service suite. Early engagements with these organizations did not lead to a collaborative relationship. While SCENE managed to deliver some commercially successful projects working in cooperation with community groups, the pace and scale of the work was too slow to remain commercially competitive. This slow pace and deliberative style of decision-making within the target customer group further inhibited our technology product, SCENE Connect from attracting a critical mass of users. The strategic response of SCENE was to attempt to build a complementary but differentiated business model that could respond to identified
market gaps whilst aligning to the greatest extent possible with frameworks and language supported by the Scottish Government. There were marketed differences in the speed and quality of engagement between SCENE and private sector businesses by contrast to public sector organizations.

My experience working directly with local energy organizations, had served to validate my prior thinking on the merits of local empowerment through RE ownership. In addition to RE bringing clear benefits in terms of fossil fuel displacement, economic development and energy security, local energy ownership was also democratic, and socially just. Those communities who managed to secure ownership over RE resources often did so through a deliberative and collaborative governance process. When ownership was secured, in whole or in part, in the form of equity participation or outright stewardship of an operational asset, local communities were attracting new revenue streams which stood to redistribute wealth to areas of most need. Throughout the period in which I was active within the organization, it became clear how important the matter of local ownership was to Scottish communities. With a history dating back many centuries, the legacy of past conflict reverberated in Scotland’s modern political economy, especially amongst communities within the Highlands and Island territories. This legacy was in part a driver for the Scottish government to develop specific policies that could address the unique, contextually specific dynamics of the local authorities, councils, development trusts and charities set up to further sustainable local development in rural areas. At the same time, academic research has shown that local communities worldwide stand to benefit similarly irrespective of their history or geography.

My own deep sense of urgency about climate change and my professional commitment to act in a manner that could help to meaningfully address the issue, continued to affect me personally and emotionally throughout this period. In terms of my personal financial situation, I had at least proven to myself through SCENE that I could subsist on a salary from a job which I had manifested through leading the creation of a truly sustainable venture. My experience of SCENE gave me the confidence I needed to continue to ideate and ruminate on new organizational models and new commercial opportunities that could deliver the scale of change and sustainable transformation I was adamantly seeking.

I am currently preparing a stand-alone version of this chapter for submission to peer-reviewed journals. I will obtain Open Access permissions following any offer to publish the completed work, prior to publication.

5.1. Background

By the time I’d reached the fifth year of my sustainable entrepreneurship journey, I began to reflect on the results of my efforts and to consider what direction I should head in next. I remained deeply compelled by my sense of urgency about climate change. By the summer of 2014 it was becoming increasingly clear, largely thanks to the extensive reporting of the IPCC, that climate change was indeed a very serious threat to both human and non-human species, with drastic implications for the livelihoods of future generations. While my expectations for my own contribution to helping solve climate change were somewhat limited, I held the belief that acting was not only necessary, but dutiful. As to what form and function my action could take, I continually sought to evaluate my past work in an unstructured and haphazard manner. Had I managed to effectively deliver on the core objectives laid out for the SGRF and SCENE at the start of the venture creation process for both organizations? Were these objectives the right ones to begin with? Were the organizational models well suited to meet all of the objectives? If so, were my methods suitable for delivering on those objectives? Might things have turned out better or worse had I chosen to act differently at key inflection points throughout each venture creation process? What were these key inflection points? Were my actions aligned with my values and beliefs? Was I moving in the right direction? The question of effectiveness was particularly important to me, given what little time I had in-between ventures to speculate. Admittedly there was also the slippery problem of self-doubt. If one spends too much time deliberating over one’s own effectiveness or lack thereof, this could lead indecisiveness. Time is of the essence when enacting entrepreneurship, and indecisiveness can be highly detrimental.

In order to determine what had worked well and what hadn’t, I was inclined to focus almost entirely on the problem of climate change, in all its contextually relevant manifestations, alongside more conventional business success factors such as fundraising quantum, customer validation and revenue generation. I was aware that I would be judged by others in light of these factors and that, also these more objective measures of progress were proven within the state/market context I was operating in to greatly influence fundraising success. Given that the SGRF failed to launch, and never succeeded in delivering any services or securing any revenue, I tended to view my work with SCENE as being more effective than my work with the SGRF, at least in terms of delivering quantifiable results. However, there were also individual impacts to consider from the experience gained in both cases and I did tend to see myself on an improving trajectory, albeit slowly and through an arduous, unpredictable, and difficult to ascertain process of trial and error. In terms of what had
worked well on an individual level, I was prone to thinking about this in light of my own career development. By summer of 2014 I had clearly progressed from being an inexperienced, underfunded relatively anonymous PhD-level academic researcher to a more experienced, funded and at least somewhat effective sustainable entrepreneur. At least this was my own determination. I found the encouragement of others in my professional network, including their willingness to often follow me on a venture into the unknown, to be a positive proof point for validating my efforts as well.

My first new venture with the SGRF steering group had succeeded in convening influential individuals across various sections of the Scottish sustainability and governance ecosystem. We shared many enriching conversations and debates about the future of Scotland’s international role in climate change diplomacy and explored specific topics within that discourse that stimulated further conversations at Scottish government-level through unofficial channels. Areas where the SGRF had striven to make an impact included discussions on the dependency of Scotland on critical materials and rare earth supply chains from external markets, to support the long-term development of the domestic RE industry, as well as Scotland’s role in helping to further cooperation with other sub-state nations and regions to build offshore wind and onshore grid and battery infrastructure in pursuit of decarbonizing the UK’s energy system. However, the SGRF never fully executed on its organizational aims. The business model we sought to put in place never materialized, as it was never collectively agreed. With SCENE, while we did manage to deliver some positively impactful outcomes for local communities in Scotland, the organization also fell short of its wider aim to, “offer local organizations and businesses... a social network for exchanging knowledge on best practices.” Although at the time of writing, SCENE continues to provide RE services to local community organizations in Scotland, our vision of a global community energy social network never came to fruition. When I officially left SCENE in 2014, I grew more curious about the role that digital technology could play in helping to accelerate the adoption of RE sources. Our work at SCENE did involve some data collection and geospatial data mapping, as we had sought to understand more about the opportunity landscape of local community needs in Scotland, and also to lay the groundwork for a potential social network application to-be-developed. Indeed, while I was at SCENE we had succeeded in building a working prototype of an interactive Web-based geospatial mapping tool using Google Earth Pro. The tool was an interactive map of local community organizations, with clickable details about their sustainable energy projects, including location, technology type, funding source, business model, and organizational participants. While the application never manifested as a social networking tool, I did learn quite a lot about various geospatial data mapping technologies, including open-source toolkits, that were available to sustainable energy practitioners. This new knowledge sparked a curiosity about digital technology in general and was further stimulated by my social interactions at networking events, some of which had been taking place at the University of Edinburgh. One such influential networking event that ultimately came to help define my next sustainable venture, took place on the tenth floor of Appleton Tower. This event was called ‘TechMeetup.’
TechMeetup was an informal meeting group, started by innovative students, researchers and entrepreneurs situated primarily within the University of Edinburgh School of Informatics. The group brought together likeminded individuals working in various fields including industrial mathematics, robotics, Artificial Intelligence, and computer science on a bi-monthly basis in a conferencing room in Appleton Tower. According to the group’s official website, “TechMeetup is a monthly excuse for developers and the tech community around Scotland to meet up and learn new stuff from each other (TechMeetup Website, 25/07/22).” Learning from the participants and presenters in the TechMeetup community was certainly something, which I experienced and found valuable. However, after attending several of the events, I discovered other notable benefits. TechMeetup was a place for prospective founders to test out new innovative ideas in front of a friendly, well informed, and technically proficient peer group. The relaxed, informal environment meant that presentation styles could be more conversational. This encouraged candid audience interaction, that in turn would elicit honest feedback that could be especially helpful to those either interested in commercializing a newly discovered technology or investing time and resources in developing new technology, thought to have commercial potential. TechMeetup also served to assist start-up founders with recruiting needs. It gave investors who attended the chance to gain deep insights into the latest technology ideas as well. While I never had the opportunity to meet or interact with anyone in the TechMeetup founding group, it was rumoured that the founders of one of Edinburgh’s most successful technology start-up companies, ‘SkyScanner’ had secured their first investment as a result of a TechMeetup encounter with an investor. Indeed, some of Scotland’s more prominent Angel investor syndicates and Venture Capital firms were known to frequent the venue in search of investment opportunities and TechMeetup counted SkyScanner as one of its dedicated sponsors.

I don’t recall the exact date of my first attendance, but I do recall being intrigued by the uniquely effective format, which deviated substantially from a typical conference or networking event. TechMeetup had a lateral structure. Every meeting began with an around-the-room 30-second introduction where every attendee, in no predetermined order, had an opportunity to introduce themselves and to mention what they were looking for or working on. There was no entry fee, and attendance was open to anyone, irrespective of their University of Edinburgh affiliation. Pizza, beer, and other refreshments were supplied free of charge, thanks to the sponsorship of a local law firm as well as SkyScanner and Informatics Ventures, the venture investment arm of the School of Informatics. Presentations were focussed squarely on the technology or project of the presenter’s choice and kept brief, providing ample opportunity for questions, comments, and discussion. The bulk of the time was allocated to networking and socializing. I found the informal format especially accommodating to sharing ideas, as well as knowledge and exchanging contact information with a wide variety of researchers and professionals working on all manner of digital technology projects. So-called ‘non-technical founders,’ which was essentially a euphemism for a person who didn’t know how to write code, were encouraged to attend, and mingle. Given that I fit into the category of ‘non-technical founder,’ I was especially appreciative of this aspect. There was either a deliberate or an implicit strategic element to encouraging ‘non-technical’ participants as well;
those with differentiated, but potentially complementary skillsets could come together in a comfortable space and explore possibilities for creating new ventures.

After attending a few TechMeetup events, it occurred to me that there was a noticeable absence of sustainability researchers and practitioners in attendance. In fact, the topic of sustainability, at the time, wasn’t integrated or actively encouraged by the organizers or sponsors. Still the experience of attending, and the many obvious benefits to would be founders, left an indelible impression, and I began to consider that I might somehow re-enter the fray of digital technology innovation which I had begun with SCENE, through this newfound channel. I was also thinking more broadly about the absence of sustainability sector representation within the University of Edinburgh digital technology community and vice versa. The impact of technology on the natural environment is core to the issue of climate change and to sustainability more broadly. Yet it seemed that there was very little interaction, if any, between the different student, researcher, and practitioner communities. This was the case as well between the different innovation hubs in the ECCI and Informatics Ventures. Each had its own purpose, vision, and objectives, with the ECCI addressing climate change challenges and Informatics Ventures focussing on research and development, technology, commercialization and attracting Angel investment and venture investment. As ideas for a new digital sustainable venture began to form in my head, I came to realize that I would need to broaden my network beyond its existing reach to include technologists. I also realized that I would need to bolster my own credibility with this community and to ideally earn some foundational capital with which to begin putting certain product ideas to the test. The result of the above coalescence of factors drove my decision to start a new events group, modelled on TechMeetup but based out of the ECCI. I called this ‘GreenTech Meetup (GTM).’

For the approximately 12 months I ran it from October 2014-2015, GTM proved fruitful. I was able to secure free venue access to the ECCI, as well as sponsorship to cover food and refreshments and a modest stipend to cover my labour costs. A total of six events took place during this timeframe. GTM was reasonably well-attended with the average number of participants reaching around 40 individuals per event (GTM website, 20/06/22). By summer of 2015 the total membership list had grown to 225 registered participants. Researchers and practitioners from sustainability and technology communities were both represented, and I took care to ensure that the timing of GTM events did not clash with those of TechMeetup. I also personally invited some of the regular attendees of TechMeetup to attend GTM events, which some did. There were additional positive outcomes to GTM that extend beyond the boundaries of this chapter, but one outcome that had a significant impact on my next sustainable venture was when I was fortunate to meet my next co-
founder, Chris Nater. Chris was a former graduate of the University of Edinburgh’s computer science program, and a passionate sustainability advocate. He happened to attend one GTM event where I had voiced my own interest in seeking out a co-founder proficient in coding to explore ideas related to RE and digitization. This led to a series of informal meetings where Chris and I laid the foundation for an entirely new digital product tailored to RE development professionals. We called this new digital product ‘CIPA’ or ‘Cost of Interconnection Prediction Algorithm.’

5.2. Context: the political economy of interconnection planning in Scotland

The experience of RE development that I had gained through my work with SCENE and in partnership with SHPL taught me several practical lessons about the difficulties facing the industry. While the Scottish government’s climate change policies, and the UK government’s energy and environmental regulatory agencies were mostly aligned on incentives for RE planners, a lack of reliable geospatial data on critical development-related subjects in the UK, permeated the industry creating challenges for sector participants. Firstly, there was the issue of geospatial data availability. Project planners are faced with a variety of critical questions that they must attempt to answer, in order to assemble a feasibility study and to identify prospective project risks. Feasibility studies identify and seek to address project risks where preliminary forecasts indicate that a sufficient IRR is achievable from the sale of electricity to customers if the project is granted planning consent. They are foundational to the planning process and a key step in securing development capital. Reliable, useable geospatial data is fundamental to any sector participant seeking to carry out a feasibility study or to assess the accuracy of a feasibility study. Geospatial data in the form of solar irradiance and wind speed indicators, captured from NASA or ESA satellites are one ubiquitous example of the data relied upon for solar PV and wind power development. Power output and yield forecasts, with appropriate variability and scenarios, depend on accurate calibration of historical data extracted from satellite sources. Another example of geospatial data that is key to RE planning is the current power grid infrastructure dynamics, including available network capacity, locations of HV lines, substations, and existing power plants. Land ownership and property boundaries are another key geospatial data category. These data sources must not only be found and trusted, but they must also provide adequate coverage for RE planners as well for the geographies under analysis.

The problem with geospatial data used in RE planning is that it is often unavailable, expensive, out-of-date, mislabelled, or incorrect. In cases where the right data sources can be identified and trusted, data are very rarely published in machine-readable format (e.g. .csv, .xls). This lack of machine readability makes data validation and software application development tedious; it further complicates the process of assembling a reliable feasibility report. When data is available, machine-readable, accurate, and affordable it may be very limited in scope. Thus, for an RE firm attempting to build a portfolio of suitable RE sites, this limitation in geographical coverage of available data can compound difficulties in achieving diversification of the project portfolio; a fundamental concern for RE firms attempting to scale their business operations. Beyond site analysis and building accurate project models, RE
development is also a very human, relationship-driven process. Projects under development involve bespoke consortia of sector stakeholders whose efforts are concentrated on a site location that in the UK is almost always privately-owned. RE firms that undertake site selection, analysis and planning must negotiate land access, including leasing and option agreements, with private owners; a process that involves relationship building with the proprietor. The interpersonal nature of these negotiations between the firm and the owner is a risk factor for RE firms who must often make an approach to a landowner who they do not have a prior business relationship with. Building trust and establishing a commercial partnership is time consuming and can involve several in-person meeting sessions to discuss specifics and establish mutually agreed conditions for site access. Neighbouring properties must often be traversed in order to access sites, meaning that neighbourly relations can come into play. This is especially the case if the transporting of heavy equipment must take place, as with stand-alone wind installations, wind farms, solar farms, or hydroelectric dams. RE firms must therefore rely on available geospatial data in order to conduct preliminary due diligence on both a prospective site as well as a prospective site owner. Distance to the site and the degree of difficulty in getting there caused by terrain, time of year, and associated costs (e.g., fuel, labour, subsistence, accommodation, entertainment) must all be accounted for and considered in the site assessment. RE firms are beholden to whatever geospatial data they can manage to collate and validate in order to determine the likelihood that a potential site owner, as well as the site itself, will be worth the frontloaded costs associated with committing to undertake multiple site visits, feasibility reporting and financial due diligence (e.g., to assess counterparty risk). During my time with SCENE we attempted to resolve many of these geospatial data challenges by collecting and organizing the data ourselves, through online research and liaising with local communities. We at first initiated surveys and sent these out via email to local energy organizations, however the response rate of ~10% was inadequate to base decisions upon about how and where to engage with prospective partners. An unexpected benefit of undertaking the data collection work, was that our investigation into the various data sources required in order to map the opportunity landscape opened our eyes to the possibilities of GIS data mapping, open-source toolkits and software application development. It was my introduction to GIS data tools built for the RE sector and the underlying processes involved in utilizing open datasets to build applications that could help to accelerate RE planning that led to the idea of building a new software product called CIPA.

My experience with SCENE and SHPL working with local community organizations to plan RE development in Scotland had opened my eyes not only to the significant opportunities to decarbonize the energy system and address climate change through locally led RE, but also to the constraints and prohibitive factors inherent to the RE development process in general. A variety of procedural and resource constraints stood in the way of efficient, effective RE development for Scotland’s local organizations. These included a lack of relevant skills and RE development experience within Scottish communities, a lack of access to pre-planning financing options, difficulty in achieving timely planning consent and an absence of genuine private sector co-participation (SCE Investment Forum, 18/10/11). Indeed, these
were some of the main business challenges which SCENE had sought to address with a service model and attempted product suite that could help local organizations to achieve RE ownership and co-ownership at scale. However, when it came to thinking about how digital technology might help to overcome some of the barriers to RE development in general, many of the above factors that stood in the way of more efficient RE deployment weren’t especially ‘technical’ in nature. One of the key learnings from my experience leading SCENE as a co-founder was that local organizations in their myriad structures are culturally deliberative (Respublica, 13/02/2012). Development trusts, charities and social enterprises favour decision-making that is consultative, democratic, and by extension, slow paced. In contrast, private sector organizations such as professional RE firms were less deliberative in their cultures, favoured hierarchical decision structures and were much more experienced in deploying RE projects successfully in far less time. Intuitively, it seemed clear to me that if my goal in going forward was to continue on a mission to accelerate RE project development as a multifactorial solution to climate challenges, any digital product I may co-develop would need to resolve a specific pain point or array of pain points for both local organizations and private sector organizations alike. Had I been compelled to only focus on technical challenges related to local organizational RE planning and development, the size of addressable market would easily have been too small and the buying decision, too deliberative and slow paced to warrant the time and effort invested in creating and selling a new digital product.

In my early conversations with Chris Nater, I shared a good deal of anecdotal evidence and also publicly available reports and academic research with him, to help convey what factors were getting in the way of more accelerated RE deployment for local organizations. Coming from a computer science background, Chris was not familiar with the RE planning and development process. However, as a prospective co-founder of a new sustainable venture, he naturally wanted to understand the problems the sector faced so as to assist with product ideation in search of a possible MVP that he could help build. Having a technical background in Web software development, Chris was prone to sifting through the various process-oriented factors I was relaying about the RE sector, in search of a problematic that could be understood and assessed in primarily technological terms. He often referred to these terms as ‘requirements,’ which I later understood to be ‘technical specifications requirements’ that are foundational to software application development best practices. From the beginning, my conversations with Chris were a valuable learning experience that taught me a great deal about Web software development best practices. In only a matter of weeks, my contact with Chris had transformed my thinking around the way in which solutions to climate change could radically differ according to service model and business operations. While the SGRF had sought to be a sustainable events organization and SCENE was a sustainable energy consultancy, I began to creatively explore the possibility for what a sustainable digital venture might look like.

Prior to starting GTM and meeting Chris I had been approaching the issue of climate change and sustainable venture creation through a primarily non-technical lens. While there were clear political economic factors unique to Scotland that had influenced the
opportunity landscape for both technical and non-technical solutions, my approach to innovation and coming up with sustainable solutions to address climate change had been primarily oriented toward solving non-technical challenges. Leading up to this point, I had also not drawn much of a distinction between technical and non-technical challenges or solutions as such. However, for Chris who had significant experience working in Web software development for major research organizations such as the Conseil Européen pour la Recherche Nucléaire (CERN) and the European Space Agency (ESA) as well as for tech start-ups like Ecrebo and Memrise, seeking to define the opportunity landscape in terms of technical versus non-technical factors was foundational to his ideation process. Specifically, Chris was interested in separating out which aspects of RE planning and development could most likely be improved through the use of digital technology, and which aspects could least likely be improved. I found Chris’ way of looking at the opportunity landscape helpful for aiding our exploratory discussions and eliminating product ideas that would probably not ever achieve sufficient scale. For example, the lack experience of RE planning and development that local organizations faced was distinctly non-technical, as was the lack of efficient coordination and incentives between local organizations and private sector RE firms. Negotiations with landowners, which was a common pain point for both local organizations and private RE firms, was further a non-technical challenge. These sorts of challenges were more befit for a consulting firm like SCENE than a tech start-up. From early December 2014 after several meetings and brainstorming sessions with Chris leading up to start of 2015, I set out to uncover a purely technical challenge that we could attempt to address with a purely technical, digital solution.

5.3. Formulating a plan and devising a strategy

While our efforts with SCENE to produce a social network application that we supposed might be used by local organizations to share knowledge of best practices had not progressed beyond the initial prototype stage, my skillset and know-how on the topic of GIS toolsets, open-source energy data research and the opportunities and benefits of open energy data got me thinking about the potential applications of open energy data to accelerating RE planning and development. I thought back to the event I had chaired in October 2011 with SCENE, the Sustainable Community Energy Investment Forum. Throughout that event, which involved a plethora of stakeholders including private sector law firms, banks, investment organizations and third sector agencies, we had explored many topics including pain points in the planning and development process. These were laid out in a report which I had co-written to circulate to participants. The summary of pain points facing local organizations involved RE from that report, were as follows:

- Difficulty securing planning permission
- Difficulty securing grid connection
- Difficulty securing ample finance
- Absence of a common language between communities and investors
- Lack of consistency in energy market prices and regulatory reform
- Lack of community skills and know how
• Lack of private sector experience engaging with communities
• Lack of community experience engaging with the private sector
• Lack of consistency in and/or understanding of environmental regulations
• Lack of consistency in advice
• Lack of financing options
• Lack of information on service options and costs
• Lack of guidance for overcoming barriers
• Lack of a go-between organization for communities and the private sector
• Challenge to consult with planners to ensure community benefit
• Challenge to demonstrate job growth and job creation
• Challenge to figure out how community funds will be spent/distributed
• Councils and local authorities inconsistent in their attitudes to community projects
• NIMBYism

The barriers summarized in the event report were primarily non-technical in scope, but for one: the issue of grid connection stood out as a mostly technical challenge, and upon discovering this I recalled having experienced some of the difficulty associated with interconnection planning and general grid uncertainty in my own professional experience. Indeed, I recalled from some of my project management functions and work with engineering teams with SCENE and SHPL that securing a bankable grid connection date in Scotland often constituted a significant risk factor, with high priority in the order of feasibility criteria, that often stalled or prevented projects from moving forward. Interconnection timelines in some of the most resource rich, but difficult to access regions of Scotland, such as the Highlands and Islands territories, had a reputation for being prohibitive and costly. Grid uncertainty was also a top concern for development phase investors and was linked often to a failure of projects to attract early-stage funding. Lack of financing options could therefore have some tangential relationship with grid factors. On further investigation, I uncovered through online research that grid uncertainty and prohibitive interconnection costs were, according to one study, one of the leading causes of RE project failure throughout Scotland and the wider UK.

While some grid-related factors were due to a genuine lack of available capacity, and therefore prohibitive costs to upgrade, one main difficulty impacting the planning process was in determining which sites would have little-to-no chance of securing a bankable interconnection date in the first place. Data opacity and a lack of visibility of grid dynamics, from a data perspective, was one barrier that could potentially be helped through better grid network data mapping and greater transparency. This lack of grid network data availability meant that a significant amount of wasted time and effort, including critical capital and labour resources, were being invested in RE planning applications that had little-to-no chance of progressing to operation in the first place. I knew from experience that investing in feasibility planning took considerable time and effort. To co-create a successful feasibility report for an RE project that showed promise, only to then be held back by the discovery of an interconnection date that far exceeded the forecasted delivery timescale was not only wasteful, but frustrating. In addition, for those firms that were taking development risk
on balance sheet, an unexpected delay to interconnection, that studies have shown can sometimes span multiple years, would cause significant disruption for the firm. In cases of private investment, the unexpected delay in interconnection timelines spanning an unfeasible horizon would send a negative market signal that could stand to impact the viability of additional projects in the site radius, potentially causing disruptions beyond the firm (Jones, 2014).

Interestingly, however data availability was not in this case a factor, given that the District Network Operators (DNOs) were in possession of capacity data as a result of their primary business operations being the distribution, provision, and management of electricity. The location of potential interconnection points was another factor which impacted the RE development firms’ efforts to identify and accurately report, as well as manage RE project risks. The power grid network was mostly invisible to anyone outside the DNO who wanted to get a sense of the opportunity to develop a grid connected RE project, irrespective of the technology or scale of the project. While Google Maps could be used to eyeball and manually pinpoint certain features of the network, their satellite imagery was unreliable, with typical updates made every 1-3 years depending on the geographical location. The detail and size of the data for even a small subset of the power grid network was also significant, meaning that any manual process involved in working with the data would need to ideally be automated. On further investigation, I uncovered that corporate firms such as Airbus and Maxar offered high-resolution, up-to-date satellite imagery but for a high cost that most RE firms would likely find prohibitive. Beyond online research, I carried out further research of academic articles and government-funded research projects and discovered that some leading academic researchers, mainly in the EU, had been collaborating to help structure and develop open-source techniques for collecting and validating energy data derived from a wide range of publicly available sources. Some of these are described in the following table:

<table>
<thead>
<tr>
<th>Database</th>
<th>Description</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open Power System Data</td>
<td>Free energy data platform dedicated to electricity system researchers. Founded with funding from the German Federal Ministry for Economic Affairs.</td>
<td><a href="https://data.open-power-system-data.org/">https://data.open-power-system-data.org/</a></td>
</tr>
<tr>
<td>Enipedia</td>
<td>The semantic wiki-site and database Enipedia lists energy systems data worldwide. Enipedia is maintained by the Energy and Industry Group, Faculty of Technology, Policy and Management, Delft University of Technology.</td>
<td><a href="http://enipedia.tudelft.nl/wiki/Enipedia">http://enipedia.tudelft.nl/wiki/Enipedia</a></td>
</tr>
<tr>
<td>OpenEl</td>
<td>OpenEl is a collaborative website, run by the US government, providing open energy data to software developers, analysts, users, consumers, and policymakers. The platform is sponsored by the United States Department of Energy (DOE) and developed by the National Renewable Energy Laboratory (NREL).</td>
<td><a href="https://openel.org/wiki/Main_Page">https://openel.org/wiki/Main_Page</a></td>
</tr>
<tr>
<td>Energydata.Info</td>
<td>Energydata.info is designed by the World Bank and International Finance Corporation (IFC). Access to data and information available on the portal is free, subject to their terms &amp; conditions.</td>
<td><a href="https://energydata.info/">https://energydata.info/</a></td>
</tr>
</tbody>
</table>

*Table 3: Open energy data sources*
My reading of the academic literature had confirmed my experience in the field. I discovered that data used in energy research has been called ‘tedious data,’ for its resistance to automation. Tedious data is known for its difficulties in data collection, data processing and data analysis. Energy data has a varied and complex nature, and the processes through which it is shared or published via the Internet, often contributes to the substantial effort required by researchers to rework it into a useable form. For example, important information may be contained in unorganized and difficult-to-access PDFs, as is often the case in government reports or reports produced by trade associations and other industry bodies, including private sector organizations. In the latter case, when reports are often hidden behind a paywall, the data may not be openly shared, and therefore protected by copyright. Energy data is considered tedious because it can also often be contained within spreadsheets that are downloadable, but in an unsuitable format that is not machine-readable, making the linking of datasets and/or the use of datasets for modelling purposes especially cumbersome. Another common aspect of tedious energy data is that the data may often be incorrect, requiring manual verification in order to update or make changes to correct the erroneous values. In sum, tedious energy data can be characterized as heavily reliant on manual processing and highly resistant to the sort of automation required for software application development. For example, in regards to power plant data and features of power grid networks, some common features of the openly shared data are (Davis 2015):

**Multi-labelling:** Different names are used for the same entry. Different names may also be listed for the asset owner, due to either a parent company or subsidiary firm being included. A change in ownership structure or a joint venture may also cause the original naming to be out-of-date.

**Multilingual labelling:** For international projects when multiple firms are involved in the ownership structure, language characteristics may not be easily captured or translated into spreadsheet form.

**Mislabelling:** Names may be spelled incorrectly or have labelling that contains errors.

**Label Overloading:** The same name may be used for one or many different entities. For example, if two or more power stations are in the same general location or the project has progressed through multiple phases.

**Context Dependency:** Different researchers may not use the same categories to classify the same entity. These entries may be subsets or intersections of each other and not a one-to-one match.

**Entity Discontinuity:** Entities may diverge, merge, or change over time. Throughout their lifespan, different project phases are developed, enhanced, or replaced. Phases often have different names and involve different project partners, than the original name.

There were two distinct and conflicting aspects to this discovery. On the one hand, it was clear that the tedious nature of energy data, especially that derived from openly
available sources, would make any software application development, Web-based or otherwise, difficult. The lack of a proven method for validating and processing any open energy data that we may plan to collect, would require innovation to efficiently identify and correct any errors in the data, and to make the data machine-readable. Proprietary energy data sources that were up-to-date and high-resolution such as the geospatial satellite imagery available for purchase from Airbus and Maxar would not be an option given the high costs. While Google Maps had an open API that could be used to map topographical and legacy infrastructure, any grid network data derived from Google Maps could not be relied upon to be current. On the other hand, the fact that energy data was notoriously difficult to work with might mean that RE firms involved in the planning and development of RE projects would stand to greatly benefit from having an application or suite of modelling tools that could be used for more easily, and accurately identifying project risks related to grid interconnection. As to how much time and money could be saved by relying on data-driven Web software versus manual interconnection planning, this was an assumption that would need to be tested by potential target customers. Ideally, we would need to solicit some feedback from a sample of RE firms in order to determine the state-of-the-art, and to quantify the problem of inefficient interconnection planning before moving on to determine the type of application that could be developed.

When I relayed my findings to Chris, he was cautiously optimistic about the potential to develop a Web software solution that might help to make grid data more accessible, and user-friendly for firms involved in the planning and development of RE. Assuming that there was sufficient demand for a digital product that could be used by RE firms to enhance the accuracy and efficiency of their interconnection planning, we would need to devise a suitable method for dealing with the multitude of challenges posed by attempting to develop software that would rely at least in part on tedious energy data. We agreed that more information from potential customers would be needed before taking any further action. Over the course of the next 8-10 weeks from mid-January until mid-March 2015, I set out to contact, informally, several of the former partners that I had worked with while at SCENE and SHPL. These partners included a broad selection of firms mainly specializing in civil engineering design and consulting, as well as cable installation for consented power plants and environmental impact analysis. I also had the good fortune to reconnect with an influential individual who I had encountered while working on the SGRF. This person was the former CEO of a major energy company, heavily involved in the RE sector throughout Scotland and the wider UK. Once this informal, interpersonal, and confidential process had concluded, I penned some notes outlining the potential business case for a Web software application that could be used to help RE planning and development teams, model and compare the costs associated with different cabling routes for new RE power plants in Scotland.

5.4. Market overview

I compiled my notes consisting of online research, academic research, and conversations with industry players, to map out and quantify the customer need. I had ascertained that the process of identification and assessment of grid connection
options in Scotland, largely relied on: (i) inadequate, out-of-date, unavailable energy and grid network data and (ii) hosting capacity maps provided by some DNOs via their websites, which showed existing grid infrastructure and available capacity at various points in the network but were limited in detail and total areas covered. In terms of the methods used by RE firms for designing interconnection pathways and decision-making around cable routing, these were highly manual, unscientific, and non-scalable processes, often involving teams of on average 6-8 employees and/or consultants spanning several weeks and sometimes even months for a single project. The costs associated with compiling and managing data resources for interconnection planning were either absorbed in-house or outsourced to third parties. This was the case for not only RE planning and development firms but also RE investment firms such as private infrastructure funds. Clearly, the tedious nature of the energy data related to interconnection planning in Scotland had created jobs for data analysts and consulting engineers who were tasked with analyzing significant amounts of heterogeneous data that was known to often be subject to human error, as well as being time consuming and cost intensive. According to one individual from my professional network, the average RE firm in Scotland was likely spending ~£720k per year on RE data collection and analysis. His view was this represented a sizeable spend that could potentially be reduced significantly with software and that this may in turn help RE firms to accelerate their planning efforts. According to my senior contact who used to head a major UK energy firm, the way in which consultants and in-house analysts were estimating costs was not necessarily robust either. According to her, consulting firms were taking the average cost per watt, for the region or locality, and building out cabling scenarios based on these averages. Building pricing models based on average costings was due to be wildly inaccurate.

Based on this market assessment what Chris and I determined was that the market needed a data-driven RE analytics platform that could semi-automate the calculation of grid interconnection costs and optimize route selection options for commercial- and utility-scale (i.e., grid-connected) RE power plants including solar PV, onshore wind, and hydroelectric power plants. This platform would offer a uniquely scalable solution for improved and de-risked RE planning and investment. The approach would be to create a proprietary comprehensive electric power grid database, derived from openly available power plant and grid network data and to apply algorithmic and machine learning (ML) techniques to forecasting interconnection routes and cabling costs. This would enable operational costs of interconnection to be rapidly and accurately determined through a Web interface, moving beyond limited, manual approaches. The methodology would draw on open-data resources across technical, financial, topographical, demographic, and environmental parameters creating a commercial prototype that can be used to rapidly model and compare RE interconnection cost and route scenarios. In order to validate open energy data using automated techniques, we would collaborate with a team of data engineers and grid simulation experts at the University of Edinburgh School of Engineering to develop optical-image recognition that could be applied to satellite imagery for data validation of sub-stations and overhead lines (OHL) which are predominant in areas with RE development potential. ML cost prediction would be based on multivariate analysis, and shortest path optimization to semi-automate cable route-selection. For
missing data, the customer would have the option to fill in fields with pre-selected inputs, and to toggle the inputs based on their own unique parameters. By improving and de-risking the interconnection planning process, as well as accelerating decision-making, this platform could lead to increased investments in RE projects and generate significant time and cost savings for RE firms and RE investors. Our preliminary forecasts showed that that if the approach was successful, we may be able to reduce the time it takes to choose an optimal cabling pathway from weeks and months to hours, resulting in a savings 20-weeks and ~£500k/year/company.

5.5. Partnerships and funding

Chris was supportive of my initial market assessment. However, he and I still shared concerns about the underlying issue of tedious energy data. While my research had managed to uncover a trove of academic- and government-funded research projects, some of which provided downloadable open energy data in machine-readable format that we could use for some of our prototype development, the fact remained that the reliability of this data would still need to be tested using a combination of optical-image recognition and manual techniques. The optical-image recognition scripts were available open-source through a project developed by SystemSeed for identifying and correcting the coordinates of wind turbine sites. We had a good degree of confidence that we could access the right technical support team who could help us expand this approach to other features of the Scottish power grid network to include substations, transmission towers and other power plants. The remaining grid infrastructure map could be derived from Open Street Map and accessed for free through the use of their API. While Google Maps API wouldn’t provide us with usable access to up-to-date grid network data, the Open Street Map base layer would serve as a good quality alternative. The open-source availability of these toolkits and datasets helped to alleviate some of our concerns about needing to rely on expensive, proprietary data to build and test an interconnection application. However, the ML requirement to help scale the route optimization process would require a significant volume of cost-related data for Scottish projects. As a result, CIPA was to remain an R&D initiative of relatively high-risk and we would require R&D funding support, and a wider academic team of data engineers, and grid simulation experts to help with developing a prototype before we could begin to consider any potential commercial use. Since the cable cost data was largely missing from the open energy datasets which we had identified, we would need to estimate these and then hopefully engage user testers from industry in helping to refine the assumptions, or else give up on the cost calculation component of the proposed product altogether.

In terms of next steps, we would need to source R&D funding from a public sector provider such as Innovate UK (IUK). Assuming a suitable call could be identified, we would need to include at least one industry partner from my network of industry partners, who could provide user feedback on initial prototype designs and could help to steer us in the right direction as we sought to progress from initial ideation phase through to prototyping and product testing. After several months of meetings and conversations with colleagues in the University of Edinburgh School of
Engineering, we began to feel confident that we would be able to put together a competitive IUK funding application for a Smart Award. However, we first wanted to get a full grasp of the risks involved in building CIPA given the heavy reliance on open energy data, as well as data from industry partners with sufficient volume to warrant the use of ML. We set out to identify the project risks and outline an appropriate mitigation strategy for addressing these. The following is a sample of our efforts that we included in the Smart Award application:

<table>
<thead>
<tr>
<th>TECHNICAL DATA</th>
<th>RISK DESCRIPTION</th>
<th>MITIGATION (PREVENTATIVE)</th>
<th>MITIGATION (CORRECTIVE)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Access to data / data is of insufficient quality and/or quantity, which leads to poor algorithm performance</td>
<td>Openmod data for sub-station locations and Open Street Map grid network data is good quality for Scotland. PB/CN team partners hold some primary cost data. Open grid data for Scotland is good quality and quantity. Some optical image recognition applications for power sector use are open source. Significant domain knowledge in the team. Make use of open-source code to develop optical image recognition application. Commercial costings data available from PB/CN partners, robust commercial network in the power sector. PB/CN’s commercial network and advisor’s networks. Continuous model improvement through iterative development as more primary data becomes available through user engagement.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Integration of data is complex/errors in the model</td>
<td>Initial feasibility is positive. Team are expert in energy data management, data-science, and energy markets. A sufficient time buffer has been added in the work plan to account for unforeseen delays. CN leading with technical expertise. Bring in extra technical resource if required. Established strong relationships with commercial sector, public sector and academia. Successful demonstration of UK capability can demonstrate added value to additional commercial partners outside the UK. Data science tools can be used to extrapolate data for locations with missing data.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Inaccurately calculated metrics/incorrect data used to calibrate model</td>
<td>UoE have access to primary cost data for UK. In addition, cost data for US and continental EU is available. The project will develop the algorithm based on locations with available data. Where access to additional primary cost data is unavailable, averages will be used. Feasibility demonstrated good agreement between the simple model and available data. Existing deviations likely due to the lack of geospatial data in the simple model and inaccuracies in the data. Integration of geospatial data is expected to significantly improve the accuracy. Iterative testing &amp; validation of the algorithm will show any issues. The cause will be investigated through a sensitivity analysis with the aim of finding the features &amp; input parameters which influence the deviations. Any missing, critical features will be added to the algorithm.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prediction algorithm not agreeing with data</td>
<td>PB/CN will provide enhanced security and adequate encryption. Comply with relevant international data protection certificates e.g. ISO 27001 international standard that describes best practice for an info security management system. Plan includes investigation of user requirements. User research will be made a priority by both partners. Testing should highlight issues. Testing will highlight issues which the team can address through further development. If required, we could consult specialist external experts to supplement the team.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Security and protection of data</td>
<td>UoE has extensive experience in developing grid simulations, and in interpreting and using the results to guide grid operation and extension.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Usability/performance does not meet user’s needs</td>
<td></td>
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<tr>
<td></td>
<td>Difficulty in integrating grid simulation with algorithm</td>
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</tbody>
</table>

Table 3.1: CIPA project risk register

5.6. Outputs

While much of the detail surrounding the Smart Award application that we eventually applied for and won, is commercially confidential the outcome was that we were able to secure sufficient funding and partnerships to build the initial prototype for CIPA. The following is a brief outline of the approach and outcomes:

With a full project team in place that included several PhD and postdoctoral researchers, data engineers and industry advisors, we spent the next 24-months working together to produce a working CIPA prototype that could be tested in a Web software application and further defined and refined according to user-generated feedback from the target RE firms who expressed interest. The ultimate goal of CIPA was to produce a heuristic measure of the cost of connecting a new solar or onshore wind power plant to the grid given the coordinates, generation capacity and voltage level of the hypothetical plant. Given a map overview of the location of the plant, and its closest grid connection point retrieved from Open Street Map (OSM), the map can be segmented into multiple cells. Each cell can be assigned a cost of visiting the cell, and graph search algorithms can be implemented to calculate the path of least cost. The implementation of graph search algorithms is not new; however, this relies on each cell being assigned a cost that is susceptible to multiple variables. At the time
the project was in development, little research had been done on implementing graph search in finding OHL routing paths. Therefore, one of the core aims of CIPA was to develop accurate cell costs given the location. The underlying assumption was that sufficient data will become available to accurately produce this estimator through engagement with industry partners who would participate in user testing. This effort has been successful, but the details are confidential. To overcome the challenge of lack of available primary cost data for cabling and components, the prototype focussed on a short-term aim which was to develop a search algorithm that can accurately generate least cost paths, and where these can be augmented by the user with their own data to produce accurate predictions.

A description of the prototype is as follows:

The System Flow Chart shown above takes the capacity, transmission voltage and coordinates for a power plant and produces an estimated cost of interconnecting that plant to the grid. For the implementation of the calculator, a large proportion of the data required for the successful calculation of cost comes from the coordinates of the project. It provides terrain type information, distance to the closest substation, and average regional cost of labour. The distance to the closest substation is found using a combination of a path-finding algorithm in conjunction with OSM data. The remaining fields are calculated directly with the provided input data, providing an expected percentage error:
Figure 4.2: Sample site location with OSM data showing electrical infrastructure

Figure 4.3: Sample site cable route between power plant and sub-station

Figure 4.4: User data inputted in sample routing test
5.7. Discussion and analysis

The CIPA prototype Web application enables a heuristic estimator for an otherwise complex calculation that ordinarily requires a manual team to undertake several weeks of thorough due diligence to route a prospective interconnection pathway. Its purpose is to provide a rapid, reliable and efficient estimate, to augment the actual cost of interconnecting the project once planning consent is granted. The application algorithm is able to detect the closest substation to a given location, visualize the start and end locations on a map, generate a heatmap of the terrain costs and provide an approximation of the cost of a generated least cost path line. It generates OHL routing paths that closely resemble existing OHLs that exist on OSM. By altering the terrain multipliers, low-cost paths can be generated, and they can be compared across different scenarios in order to consider different optimal routes. Additionally, the cost calculator has editable parameters for cost calculations, utility pole spacing, for terrain type multipliers and more. We assumed that user testers from RE development firms would prefer to use different values for these parameters, given the variance in supplier costs, e.g., from subcontracted cabling firms. As they are changeable, the application inputs can be verified by an industry partner. The relatively simple configuration and intuitive user interface provides a great benefit to end-users in that it is easy to assess the causality of the decisions made by the algorithm. This makes it easy to manipulate the path to avoid certain obstacles or high-cost areas by altering terrain multipliers.
Chapter 6: Cross-case Analysis and Synthesis

6.1. Introduction

The above case studies provide detailed insight into the individual and state/market factors that shaped my experience of sustainable entrepreneurship in Scotland between 2009-2019. My personal background in each case, evidences the values, circumstances, and normative assumptions motivating my efforts to enact solutions to climate change through the medium of venture creation. The case study approach provides relevant, credible, and transferable accounts of the cases, describing each venture with emphasis on political economic factors of analysis. In addition to providing access to detailed information that is normally off-limits to researchers, the case studies are designed to aid the efforts of researchers and practitioners in their pursuit of developing a wider and deeper understanding of the individual motivations, structural factors and situations that can foster or inhibit sustainable venture creation. In this chapter, I employ a reflexive approach to identifying themes that prevail throughout each case in response to the research questions:

(i) How and in what ways do sustainable entrepreneurs go about creating sustainable ventures? What sort of processes do they follow?

(ii) What individual factors motivate sustainable entrepreneurs to create sustainable ventures? What about state/market factors?

(iii) How do these individual and state/market factors influence the process of sustainable venture creation? Do they help or hinder the process?

Viewed through a critical political economy lens, the resulting cross-case analysis and synthesis makes a new contribution to existing knowledge in the field of entrepreneurship research. This new knowledge of what motivates sustainable entrepreneurship and how the practice of sustainable entrepreneurship in Scotland is impacted by structural factors at the state/market-level can help to inform further practice-theory-oriented research and research methods. This new knowledge derived from the empirical evidence of my experience may also serve academic researchers who aim to encourage new sustainable venture formations among their students and/or are enacting sustainable venture creation themselves.

The political economic context that shaped my experience of entrepreneurship in Scotland during the period 2009-2019, including the activism of third sector organizations and, the policy and leadership on climate change shown by the Scottish government were together foundational in creating opportunities for me to lead the creation of new sustainable ventures. The political economic situation of Scotland during this period manifested a resource- and knowledge-rich environment in which my practice of sustainable entrepreneurship was largely supported. The above case studies provide strong evidence that the practice of sustainable entrepreneurship is driven at least in part by structural political economic factors, at work both within the inner life and visionary process of the individual entrepreneur as
well as throughout the process of enacting sustainable venture creation in cooperation with stakeholders. In turn, the individual value system which defines the agency or actor-positioning of the entrepreneur, as well as their personal circumstances in life, relates contextually to the state/market dynamic at play, and may greatly influence the outcome of the venture in terms of success or failure. To follow this latter point to its conclusion, I am arguing that the practice of sustainable entrepreneurship is positioned most effectively and, therefore successfully when the individual entrepreneurs’ values and motivations, as well as their process of venture creation aligns with the political economic system of the state/market context they are operating in. In sum, where the value system of the individual aligns with the value system of state/market, sustainable entrepreneurship can arise and succeed.

The evaluation of entrepreneurial outcomes, from the perspective of the entrepreneur themselves, presents a complex and multifaceted challenge encapsulating myriad reasons why entrepreneurs encounter formidable difficulties in objectively gauging the success or failure of the ventures which they have created. This difficulty arises from the inherent subjectivity intertwined within the entrepreneurial experience. Entrepreneurship is inherently characterized by uncertainty, risk and dynamic interactions with the external environment, rendering it arduous for entrepreneurs to disentangle their personal biases and perceptions from objective indicators of success.

Central to this dilemma is the phenomenon of cognitive bias. Entrepreneurs, being emotionally and financially invested in their ventures, often grapple with confirmation bias, where they selectively perceive information that aligns with their preconceived notions of success. This bias blinds them to potentially critical feedback and negative indicators, distorting their judgment and hindering their capacity to assess their ventures objectively. Similarly, the optimism bias prevalent among entrepreneurs leads to overestimations of success probabilities and an underestimation of potential risks, further complicating the pursuit of an unbiased evaluation (Cassell & Cunliffe, et al. 2018).

The deeply contextual nature of entrepreneurship further exacerbates the predicament. Entrepreneurs operate within intricate state/market contexts in which they are embedded, making it challenging to isolate the impact of their individual actions from broader contextual influences (Johannisson 2011). While traditional success metrics such as profitability and growth may provide some objective indication of achievement by which entrepreneurs can label their ventures, political economic objectives inherent to the process of sustainable entrepreneurship make identifying and mapping success criteria even more difficult. Political economic motivations and actions aimed at addressing climate change through the medium of sustainable venture creation render further consideration of the value of assessing cases on the basis of conventional criteria or subject to the same assumed operational stages of venture development. This makes for an interesting point of discussion that I should like to take up as a researcher evaluating case studies presented by other sustainable entrepreneurs. If provided the opportunity to undertake such comparative studies, I would be interested in developing a new set
of success metrics and development stages by which sustainable ventures can be evaluated for successes in addressing climate change.

Utilizing the theoretical framework of critical political economy and taking a reflexive approach to analyzing the case study data, I have identified two intersecting political economic themes that emerge from the three cases and provide a consistent thread that ties them together and helps to explain the relationship between myself and the Scottish political economic landscape, experienced throughout the process of sustainable venture creation. These are: environmentalism and progressivism. Through the thematic analysis presented below, I identify and elucidate the key political economic drivers at play at both the individual and state/market level. I discuss some of the tensions inherent in the process of sustainable venture creation between individual and state/market level that arise through the political economy analysis and explore how these are treated in the context of each venture. I also critically evaluate my research to offer a more balanced view that accounts for my positional, normative, and observational biases. I conclude with a synthesis of findings, laying the groundwork for discussing and exploring implications for the theory and practice of sustainable entrepreneurship.

6.2. Thematic overview

Throughout my entrepreneurial journey I have sought to constitute my practice as a tactical response to climate change and related challenges. While the onset of human-induced climate change, including ecosystem destruction, and atmospheric destabilization on a global-scale, is a newly emerging phenomenon, entrepreneurial activity has historically been defined by its tendency to disrupt the status quo (Schumpeter 1942). Irrespective of the value system that motivates the individual entrepreneur along their quest to create a new venture, political economists who are both champions and sceptics of modern capitalism align on this characterization of entrepreneurial endeavour (Schumpeter 1942; Kirzner 1973, 1999; Strange 1999; Harvey 2007). Going back to Schumpeter (1942) who remarked that “at the heart of capitalism is creative destruction,” and continuing with Harvey (2007), who states the “process of neoliberalization has entailed much ‘creative destruction’” entrepreneurial action is synonymous with scepticism towards ‘business as usual’ and therefore it is a practice, deeply intertwined with conceptualizations of power (Granovetter, 1985; Baumol 1990; Douhan & Magnus 2007; Tilley & Parrish 2009). Whether researchers are examining the efforts of technologists to capitalize on a new invention or the efforts of lobbyists to transform government institutions, the critical faculty underlying entrepreneurial endeavour is that aspect which aims to contest embedded hierarchies (Levy & Scully 2007) in pursuit of a desired transformation (Gibb 2002). If all entrepreneurial activity is political economic in nature, then what distinguishes the practice of sustainable entrepreneurship from the practice of conventional entrepreneurship? I argue that this is a matter of the aims and motivations driving the individual’s entrepreneurial actions (Tilley & Parrish 2009; Shepherd & Patzelt 2011; 2016). What is the entrepreneur’s future vision? How does their vision align with the state/market context in which they operate? Individual motivations matter because the extent to which an entrepreneur is successful in fulfilling their vision depends on
how well their vision aligns with the state/market dynamics at play. The nature of the entrepreneurial response to contextually-specific power structures that shape the opportunity landscape, is derived from institutional cultures at various governance scales over which the entrepreneur may have little or no influence (Gramsci 1975; Gibbs 2009). Governance is itself a contested space, where entrepreneurs may or may not be in a position to exert influence over policy-making (Parrish 2007; Tilley & Parrish 2009; Gibbs 2009). The individual entrepreneur’s own positionality as concerns their class, race, gender, sexual orientation, geographical location, ability, and access to capital resources also has a definitive impact on their capacity to contest hierarchies in pursuit of a transformative vision. A comparative study examining how factors of identity impact the capacity of different sustainable entrepreneurs to succeed under structural conditions and in political economic contexts deemed ‘favourable’ would make for valuable research. This goes beyond the scope of this thesis, however.

What I have set out to do in this chapter is to combine these coalescing, interweaving spheres of action between individual-state/market into a single analysis, whereby the contextually-relevant political economic factors that define the opportunity landscape are met by the individual actions and value system of an entrepreneur, in myself, seeking to enact sustainable transformation in contested space (Gramsci 1975; Strange 1996, 1998; Scholte 2000; Cox & Schechter 2002). Viewed through a critical political economy perspective, what I have expected to find in the interplay between individual and state/market is that my efforts aimed at transformative action are situated within a contextually-specific set of defining features that are distinctly political economic and constitute empirically valid factors of analysis warranting consideration that transcend strictly market-oriented approaches. In the following analysis I provide a brief political economic description of and justification for the themes of environmentalism and progressivism that arise from the case studies. I reference the empirical data laid out in each case and reflexively assess the individual-state/market dynamics in the context of these themes and reflect on how these impacted my practice. I then synthesize and summarize key findings, for use in aiding discussion and further research. I conclude with remarks on how this analytical framework of reflexive autoethnography when combined with a case study approach can help to broaden and deepen the range of available case studies and empirical data available to researchers in their study of sustainable entrepreneurship.
6.2.1. Environmentalism and entrepreneurship

Environmentalism in theory and in practice has been a topic of academic interest across multiple disciplines dating back to the birth of the modern environmental movement in the 1970s. As it pertains to entrepreneurship research, there are conflicting definitions and intriguing theoretical quandaries regarding what empirical factors distinguish an environmental entrepreneur from an activist. In the case of environmental entrepreneurship this term has come to mean either a practice concerned with venture creation aimed at capitalizing on the failure of markets to sufficiently protect the environment or a specific identity within a wider ideological movement aiming to protect the environment through both commercial and non-commercial activities. In the latter case, an environmental entrepreneur who is aiming to create a non-profit organization to protect rhinos from being the targets of illegal poaching in South Africa, falls into the same research category as a tech start-up entrepreneur seeking to raise venture capital for lab-grown meat in California. Researchers have also identified and sought to distinguish ecological entrepreneurs for their more radical attitudes exhibited in their actions, to advance their ecological goals often in opposition to commercial activities (Gibb 2009; Kaesehage & Leyshon 2019; Murnieks, Klotz & Shepherd 2020). By this definition the creation of an organization such as Extinction Rebellion, a UK-based radical ecological action group, may be considered entrepreneurial despite their sometimes-controversial methods of public protest. Both types of entrepreneurialships, environmental and ecological, have at times also been contrasted with sustainable entrepreneurship, the definition of which does uniformly include commercial objectives in the academic literature (Rosário, Raimundo & Cruz 2022). To confuse matters, researchers have also identified ‘sustainability entrepreneurship,’ to qualify cases where sustainable development is the primary focus of entrepreneurial action (Tilley & Parrish 2009; Kaesehage & Leyshon 2018). Due to a lack of consensus among researchers it is difficult to make any empirically valid assertions to determine motivations and normative positions of entrepreneurs with environmentalist leanings. Perhaps environmental entrepreneurs do see themselves as different from their sustainable entrepreneur peers and ecological entrepreneurs see themselves as different from

<table>
<thead>
<tr>
<th>Case Study</th>
<th>Timeline</th>
<th>Actors Involved</th>
<th>State/Market Context</th>
<th>Individual Context</th>
<th>Venture Model</th>
<th>Product/Service</th>
<th>Funding</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGRF</td>
<td>2009-2010</td>
<td>PPN, ECCI, Mediation Scotland, Scotland 2020 Climate Group, SNIFFER, SEPA</td>
<td>Scottish independence; sub-state climate diplomacy</td>
<td>Political economy scholar; moral duty to people/ planet</td>
<td>Non-profit/ Undetermined</td>
<td>Networking and Events</td>
<td>PPN, ECCI</td>
<td>Unincorporated/ Discontinued</td>
</tr>
<tr>
<td>SCENE</td>
<td>2010-2014</td>
<td>PPN, ECCI, Climate Challenge Fund, SHPL</td>
<td>Scottish independence; politics of land reform</td>
<td>San Juan Islands native; sympathy for local action</td>
<td>Social Enterprise</td>
<td>Project Management</td>
<td>ECCI, client revenue</td>
<td>Incorporated/ Ongoing</td>
</tr>
<tr>
<td>CIPA</td>
<td>2014-2019</td>
<td>SystemSeed, InnovateUK</td>
<td>Scottish independence; geopolitics of energy</td>
<td>Renewables professionals; belief in tech progress</td>
<td>For-Profit/ TBD</td>
<td>Software-as-a-Service</td>
<td>Innovate UK</td>
<td>Unincorporated/ Ongoing</td>
</tr>
</tbody>
</table>

Table 3.2: Summary of cases
environmental and sustainable entrepreneurs (Muñoz & Dimov 2017; Kaesehage & Leyshon 2018).

According to critical political economy all environmentally-motivated action falls within the broad scope of environmentalism as a modern social movement (Scholte 2000). In terms of the individual-state/market dichotomy, none of the above types of entrepreneurial action differ too substantially from environmental or ecological action aimed at organization creation in the case of non-profits or as with lobbying efforts, taking place at government-level. When viewed from a critical political economy perspective, all seek to enact some kind of just transformation within an intuitionally-derived state/market context by disrupting embedded hierarchies which comprise the status quo (Cox & Schechter 2002; Harvey 2005). It is, after all, the persistence of such hierarchies that has led civilization to the brink of climate and ecosystems collapse. This is not to say that environmental, ecological, and sustainable forms of entrepreneurship are not distinct forms of research. It is to instead point out that the issue of ‘commercial attitudes’ is unresolved in the literature and as such, any environmentally-motivated action could be considered entrepreneurial, if it targets change within an institutional context. A much wider and deeper range of case studies and empirical evidence derived from individual experience is clearly needed in order to fully discern if the category of sustainable venture creation should encompass all environmentally- and/or ecologically-motivated entrepreneurial activity or if indeed, it is a sub-culture existing alongside other sub-cultures, with more nuanced and distinct aims, thus warranting their own separate investigations. Outside the institutional context are more radical forms of environmental action or activism such as efforts aimed at stopping industrial development, or the transport of fossil fuels, for example through forming human blockades. It is curious that while environmental action, when situated within a clear institutionally-derived political economic context, is considered ‘entrepreneurial’ supposedly because of its adherence to a legal framework, environmentalism as a movement traces its origins to the radical activism of Chipko ‘tree huggers’ of the Himalayan region of Uttarakhand, India in the early 1970s. These women and men were Gandhian activists who challenged the legal norms of their time and place through civil disobedience, forming human chains around old growth trees to prevent them from being cut down. If all environmentally-motivated entrepreneurial activity is empirically constituted through the interactions of various commercial and non-commercial groups, then these groups share a common lineage that can be traced back to the political economy of Gandhi (Gandhi & Parel 1997).

6.2.2. Environmentalism and the profit motive

Commercial versus non-commercial tensions lie at the heart of sustainable entrepreneurship in practice (Muñoz & Cohen 2018; Murnieks, Klotz & Shepherd 2020). Indeed, the question of what actions I could take throughout my journey to enact climate change solutions in a manner that would produce commercially viable outcomes was a defining feature of the process throughout each new venture. This was also a source of internal conflict for me personally, as I sought to align my commercial vision with actions that would truthfully help to address climate change.
From 2009-2019, several environmental conservation and wildlife protection groups such as the World Wildlife Fund (WWF) Scotland, Scottish Green Party, Keep Scotland Beautiful, and Friends of the Earth Scotland worked together to exert their influence over Scottish Government policy, which in turn was adapted to reflect some environmental aims, particularly concerning RE growth. The pro-Independence, pro-RE positioning of the ruling SNP was served by supporting a decarbonization platform, which was an issue-area also championed by many of Scotland’s environmentalists. For example, through my interactions with SGRF steering group members I learned that Stop Climate Chaos Coalition Scotland (SCCCS), an umbrella group representing some sixty independent organizations all supporting climate change action, was foundational in co-forming Scotland’s 2020 Climate Group. The 2020 Climate Group sought to influence policy formation through informal channels at government-level on behalf of industry and third sector stakeholders who coalesced around decarbonization goals. SCCC S was largely responsible for influencing the ambitious scale of RE targets set forth in the Scottish Government’s Climate Change Act (2009). Mike Robinson, co-founder of SCCC S was also for a time Scotland’s 2020 Climate Group Co-Chairman, providing some insight as to the potential relationship he may have had with Scottish Government policy-makers involved in working directly on the Climate Change Act. Through my experience of organizing the SGRF and interacting with the SGRF steering group, I developed an insider’s understanding of how Scotland’s environmentalists went about forming coalitions and vying to influence policy outcomes. I was inspired by the breadth of organizations and the Scottish attitude toward protecting the environment for future generations. Having grown up in the San Juan Islands, surrounded in the majesty of the Pacific Northwest with its snow-capped mountains, emerald bays, and towering old growth forests, I developed an easy kinship with the Highlands and Islands territories of Scotland and a sympathy with Scotland’s environmentalists. Thinking back to the first event I organized at the University of Edinburgh, which included former Green Party leader Patrick Harvie MSP and Simon Pepper OBE, former Chairman of WWF Scotland, and member of Scotland’s 2020 Climate Group, I was unwittingly playing a small part in promoting a historically- and contextually-rich history of environmental activism in Scotland. I had sought to capture a wide range of disparate climate change-related issues within a single framework of ‘environment, energy, economy’ as the event title implied, so as to learn valuable information about the context and opportunity landscape I found myself operating in. The reality was that the participating organizations who provided guest speakers and also included Transform Scotland, and the Sustainable Development Coalition were factional, overlapping, competing, and cooperating interest groups with their own unique histories, identities, and objectives, existing along a spectrum of environmentalism. While it suited me at the time to think of these as one unified, collective whole, sharing an ambition to protect Scotland’s natural ecosystems and wildlife, while supporting growth of Scotland’s RE sector, and address climate change at the same time, the reality is more complex.

On self-examination, it is difficult to determine which specific objectives and actions I have taken throughout my entrepreneurial journey have led to environmentally beneficial outcomes for Scotland or elsewhere. Undoubtedly, my feelings toward the
natural world are compassionate and real. I yearn to coexist with nature in a manner that does not cause harm, and especially does not contribute to climate change. I revere nature and my feelings toward nature are sincere. In my self-conceptualization, I am a dedicated, passionate environmentalist. However, my first effort to establish a sustainable venture in the SGRF could seem, on the surface, to be more a product of opportunism, borne of personal circumstances than an effort to make a meaningful contribution to Scotland’s environmental goals. My financial situation at the time didn’t favour a prolonged engagement abroad; I was running out of money and ran the risk of being unable to afford the costs of relocation. In the absence of securing funding to continue my PhD research into its second year, I was in a sense desperate to find a means to continue my research. The alternative would have been to either enter the job market abroad or to return home to the United States; both actions which I would have considered suboptimal. The situation presented me with what I framed as a choice between giving up on the one hand and starting a sustainable venture on the other. It was a forgone conclusion that, if the latter, such a venture would have to be aimed at sustainable transformation or else not be worthwhile pursuing. Indeed, this is a pattern which has underpinned all my actions throughout every aspect of my entrepreneurial journey. Persistence in the relentless pursuit of opportunity is a characteristic shared by entrepreneurs of all types. However, while my vision of a future where humanity co-exists harmoniously with nature, has been felt and experienced within the confines of my inner universe, the outward manifestation of this vision has revolved largely around adherence to the aims of the RE sector, which in and of itself is not considered environmentally-beneficial by all. The same observation can be made concerning the SNP and their embrace of the RE industry, as a geopolitical strategy aimed at bolstering the case for sovereignty. Scotland’s vast wind, wave and tidal resources were often touted by First Minister Alex Salmond as being a store of significant economic value that could, if under the control of the Scottish Government, be used to enrich Scotland’s citizens in a scenario where Scotland is a sovereign nation. In a similar rhetorical vein to the ‘It’s Scotland’s Oil’ campaign, Salmond once touted that Scotland could be the “Saudi Arabia of renewables” (Russell & Kelbie 2005).” While I was not active in party politics in Scotland at any point throughout this period, I was taken in by this bold ambition put forth by the Scottish leadership as it was not only globally ambitious, but unprecedented. Such ambition appealed foremost to my commercial instincts, while I took the positive environmental benefits of supporting RE as a given.

On some level, I considered and still do consider conformity to market norms personally unacceptable. This lack of acceptance stems from my deep sense of urgency for the environmental welfare of the planet as well as a duty to act as a responsible steward of present resources to protect the welfare of future generations. My lack of acceptance to conform can be explained by my interpretation as to what constitutes the status quo of market norms. At the time of writing, human-induced climate change is accelerated by industrial development through the corresponding global effects of atmospheric destabilization and the widespread destruction of natural ecosystems, including carbon sinks. Market norms are then, as I conceive of them, to value profitability over sustainability irrespective of the detriment to future generations. In my critical interpretation, it is this modus operandi inherent to the
dominant political economic paradigm of neoliberalism and neoliberal globalization that is in part responsible for the multifaceted crisis we find ourselves in. Neoliberalism and the tendency of its adherents and proponents to champion deregulation and to accelerate industrially-intensive development in markets where environmental practices are institutionally weak is grounded in the sort of short-termism that runs directly opposed to the long-term thinking championed by sustainability advocates. Throughout my journey as a sustainable entrepreneur, I have always felt this tension between sustainability on the one hand and profitability on the other. Scotland’s 2020 Climate Group was itself an attempt to bridge this tension at state/market-level and the Climate Act reflected what could be achieved when various industry and stakeholder organizations coalesced around a common goal to influence policy. There was clearly a willingness and a drive on the part of the Scottish government, under the leadership of Alex Salmond, to embrace sustainability as a conceptual framework that could inform policy-making. The pluralistic, liberal democratic leanings that characterized Scotland’s political economy and culture created favourable conditions for an organization like the SGRF to emerge. Yet despite a similar willingness to see sustainable objectives accelerated in complement to the Scottish government’s RE ambitions, my individual attitude and lack of commercial experience when leading the creation of the SGRF, was ultimately a source of difficulty. We did not have industry representation within our steering group. Despite our roadmap, which aimed to involve and to provide services for industry players, there were no RE sector representatives involved in formulating our plan and devising a strategy. Perhaps if I had been more focussed on profitability, the blockage we’d encountered among the steering group members would not have led to a stalemate in our own discussions around the structure of the organization and ultimate indecisiveness about the for-profit vs not-for-profit model. Granted, I was not the only one on the steering group who was undecided about how to position the organization to secure revenue streams that would enable us to deliver on the service model we had created. Looking back at the composition of our membership, we had experienced representatives of mediation, law, government, academia and third sectors. In hindsight, the absence of an equally experienced RE industry practitioner is somewhat glaring.

Why didn’t I think to approach a private sector RE practitioner from the initial concept stages of forming the SGRF? My oversight, early on to not fully embrace profitability as a driver and not to devote more consideration to developing a more profit-driven business model for the SGRF or to seek direction from an industry lead at the formative stages in the process may have been driven somewhat by feelings of guilt and insecurity. My position is one of privilege. I am a Caucasian man, born and raised in the politically-progressive Pacific Northwest United States to a relatively stable, liberally-minded, middle-class family. I have a robust personal and professional network to fall back upon under any circumstances. I hold multiple degrees from world leading universities and am in good physical health. My patterns of interpretation have undoubtedly been influenced by this materially- and socially-advantageous foundation. While I was not so well off financially to have the resources of a trust fund or future inheritance to fall back upon in the event of failure, I could have always gone back to live with my parents or a sibling or a friend or borrowed...
money from family and/or friends. My decision to advance sustainability objectives and to define climate change as a matter of the greatest personal urgency reflects, in some respects, this privileged position. I am distinctly aware that the United States, my home nation, is historically the largest emitter of GHG emissions and that our consumption levels are far beyond that of all other nations by orders of magnitude. We are also the architects of neoliberal globalization; our financial, energy and extractives corporations are some of the most globally exploitative. Our academic institutions and think tanks such as the Chicago School of Economics and the Cato Institute have advanced neoliberal politics at the most elite levels of governance, within the United States and through US-led global institutions such as the IMF and the World Bank. Perhaps on some level I felt that capitalizing on climate change, given my background as a United States citizen, was disingenuous and hypocritical. Over time with the creation of SCENE and CIPA, I addressed some of these personal conflicts and tensions by attempting to find a more harmonious balance between sustainable action and commercial gain, with the latter ultimately taking greater priority over time and with age and experience.

6.2.3. Environmentalism and venture creation

As a political economist, I was fascinated by what I had uncovered through my experience of leading the SGRF. Scotland’s rich history and global ambitions to become a world player in the climate change arena was exciting. The fact that the Scottish parliament was just a short walk away from the University of Edinburgh campus where I had an office, gave me a feeling of relevance in a context that suited my sympathetically-environmentalist viewpoint. Working with Iain Russel of Mediation Scotland, who had a direct role in the Edinburgh Conversations also reinforced these sentiments; that of helping to make history. Yet there is perhaps some irony in the fact that I had left the United States, historically the largest contributor to GHGs in the world, to come to the UK, a country responsible for a comparatively small percentage of GHGs. Other than engaging in some truly excellent conversations about the future impact of climate change and Scotland’s potential role in helping to address climate change on a global stage, we as a steering group were not directly taking any measurable action to protect the environment. In fact, the topics which we had chosen to investigate for piloting the SGRF were both related to large-scale infrastructure development. The North Sea Offshore Grid Initiative (NSOGI) and the required critical material inputs to help Scotland become a global leader in the production of onshore and offshore RE was a megaproject with transnational reach. While we were proposing an alternative power source to fossil fuel extraction, there is significant mineral and mining extraction activity involved in the RE supply chain. Graphite, cobalt, neodymium, lithium, are all key mineral inputs to the manufacture of solar panels, wind turbines and batteries. As we mapped these from the SEPA report and considered their importance to the future of Scottish industry, we did not discuss, nor did we consider the extent of negative environmental impacts that are derived from mineral extraction at their point of origin. We also did not discuss the unequal global North-South distribution of proven critical materials reserves, and the negative political economic effects that have occurred for developing countries as a result of their ‘resource curse’ accompanied by a lack of transparency and occasional gross
malpractice on the part of major multinational mining corporations. Petrochemicals used to manufacture copolymers are also key to RE technologies. Ethylene, propylene, and xylene are used to bind and protect silicon modules in solar panels and to insulate wind turbine blades from weather erosion, meaning that the transition to RE is not entirely carbon neutral and it is certainly not environmentally-neutral. There are efforts underway to displace petrochemicals with biochemicals or ‘green chemistry’ but these have yet to reach cost parity with conventional approaches and at the time of writing are outside the mainstream of industrial research.

From the standpoint of an ecological and/or environmental activist or entrepreneur, the SGRF may not seem a solution at all to the challenge of widespread ecosystem destruction caused by industrial development. While RE at large-scale is certainly better for preventing climate change, than fossil fuel development in general due to the lower GHGs emitted from the supply chain and from operation, large-scale renewables do cause environmental damage and RE manufacturing is derived from fossil fuel extraction, as well as environmentally-detrimental mineral mining. The lifespan of a RE power plant also does not often surpass twenty years, meaning that solar installations and wind turbines must be monitored for maintenance and upkeep regularly as they operate. As projects are decommissioned the components of the turbine or modules are difficult and costly to recycle and often sent to landfill where the petrochemicals used in their manufacture degrade and emit toxic pollutants. The International Renewable Energy Agency estimates that solar panels produced 250,000 metric tonnes of waste in 2018 alone (IRENA 2018). In my experience, the negative environmental impact of RE development is not a popular subject among sustainability practitioners. While those activists and entrepreneurs who focus on the problem of climate change, are often advocates of RE as a solution, they tend to ignore the waste management problem that is a by-product. Environmental and ecological activist groups such as Extinction Rebellion who participate in public demonstrations and engage in acts of civil disobedience also advocate RE as a solution to the problem of climate change and ecosystems collapse. Scotland’s 2020 Climate Group, which uniformly supported the Scottish government’s RE development goals, consisted of environmental organizations such as Friends of the Earth Scotland, and the WWF. SCCCS, a co-founding member of the 2020 Climate Group is closely involved with campaigns throughout Scotland to support the election of Green Party candidates to the Scottish Parliament.

Co-founding SCENE created an opportunity for me to address some of the underlying challenges, which had prevented the SGRF from coming to fruition. It was firstly a more commercially-focussed organization, with a clearer business case derived from a market demand that we had tested through direct engagement with target customers through organizing the SCE Investment Forum and carrying out targeted surveys. Industry practitioners from our partnership with SHPL were engaged earlier on in the process, providing me with new knowledge and insight into the profit-motive that was driving law firms, development firms and engineering consultants to direct their efforts toward the RE sector. There were clearly defined incentives at the Scottish- and UK-government level and subsidization efforts aimed at levelling the development playing field for local organizations. The introduction of
attractive FITs, as well as the availability of development loans from the CARES scheme, provided some comfort that the risk of entering the market would be manageable. For a short time, there was also the possibility to secure SEIS and EIS tax incentives for the ESCOs we incorporated to manage project equity and attract investment partners. While my personal circumstances in terms of securing funding to continue my academic research hadn’t yet resulted in support for my PhD, through my evolving relationship with the ECCI and with Scottish industry partners, I had begun to establish a track record of producing useful outputs for other academic researchers as well as Scottish government policy-makers. As my experience grew, I gained confidence in my ability to deliver value. More importantly, I had begun to see some fruits borne of my efforts in terms of being able to subsist on a salaried basis from jobs which I had created in the sustainability sector. Not only was I successful in securing employment for myself from a job which had not previously existed, but I was able to do the same for others. There was a sense of satisfaction, which I derived from this fact; that I had managed to create salaried opportunities for others through sustainable venturing, proving it was possible despite the odds and setting an example that might inspire other researchers and practitioners.

Unlike the SGRF, the results from the service model we devised for SCENE delivered measurable outcomes in the form of local-scale RE projects. In retrospect, this model was more closely aligned with my environmentalist-orientation, as well as my commercial-orientation. Local-scale RE projects are less environmentally intrusive compared to larger-scale developments. While working with local organizations is inefficient, disorganized, at times chaotic and complex, when successful the equity ownership component can generate new income streams and help to reinvigorate local populations. Reflexively, these projects also served to demonstrate alternative political economic structures that restored a sense of place and purpose to citizens equitably and sustainably.

My relationship to my practice and to profit took a further step in the direction of commerciality with CIPA. CIPA was a technical solution to a problem faced by cabling engineers and project planners both within and beyond the RE sector. While the aims of the project were to develop a tool that could be targeted for commercial use by RE firms, in reality any firm involved in the planning and development of new electrical infrastructure could benefit from its use. As with the previous statements concerning resource mining inputs into hardware that is used in the building of RE power plants, the laying of cables for electricity distribution is an environmentally disruptive process. It also often involves the transporting of heavy equipment overground, often through use of diesel-fuelled vehicles, as well as digging and traversing sometimes highly sensitive areas where protected species and/or fragile ecosystems may be put at risk. Granted, with more accurate modelling of the cable routing available to decision-makers, there is the potential to limit the amount of site visits as well that are needed to, for example, survey the terrain and triangulate data. This is a modest benefit though and not necessarily one that can be considered environmentally beneficial. While resulting reduction in GHGs from the build-up of new RE infrastructure is a positive for reducing the negative impacts of fossil-fuelled energy consumption on the atmosphere, this only solves part of the problem related to climate change. There
remains the problem of ecosystems destruction wrought by industrially-intensive development practices of myriad types.

On reflection there are patterns in the data that suggest that my career advancement throughout the venture creation process across the three case studies transitioned gradually away from a focus on climate change writ large with the SGRF and SCENE and more toward the technical processes involved in RE systems delivery with CIPA. Improving the efficiency of delivery of RE solutions through technology is still aligned with the motivation to ‘do something’ about climate change. The more RE solutions can be built at lower cost and in a shorter period of time, the greater the net benefit for a reduction in GHG emissions. Yet the development of CIPA has come at a cost, in that the tool could also be used by developers of coal fired and natural gas-powered plants. Technology as the focus of venture creation also has the practical benefit of being more attractive to sources of capital, given potential economies of scale. While the outcome of CIPA is as yet undetermined at the time of writing, when compared to SGRF and SCENE, the project has managed to attract public sources of funding in greater quantity at greater speed, as well as interest from prospective customers in the private sector. Specialization in technology in general has been proven to succeed under conditions of fair competition, where intellectual property rights are guaranteed by the state. This in turn gives reassurance to investors that if a technological solution is successful in achieving economies of scale, this could in turn lead to sizeable Return on Investment (ROI).

Conclusion

Throughout this transition in my venture creation process from generalist to specialist, non-technical founder to technical founder, there has been a corresponding trend away from positive environmental impact toward negative environmental impact. While my motivation has been to use venture creation to catalyze solutions to climate change, the need to create products and services that can achieve economies of scale and the related need to attract capital resources early-on in the venture creation process has ultimately acted as a defining structural feature, rewarding activities according to their state/market usefulness and discouraging activities that do not conform to state/market requirements. Granted, RE solutions are themselves not necessarily environmentally friendly. While RE solutions may over time significantly reduce the amount of GHG emissions that contribute to climate change, they may also, depending on the type and scale of technology deployed, cause damage to ecosystems. Certainly, this is the case at the earlier end of the supply chain where mining for the critical resources required to manufacture RE technologies is highly detrimental to the surrounding environment and also require fossil fuels to manufacture and transport core components. While still far less environmentally damaging compared to fossil fuelled power plants, RE power plants are not strictly sustainable in the sense that they only address one part of the climate crisis, namely reduction in harmful emissions. The other part of the climate crisis, the destruction of carbon sinks, may be furthered by RE development if for example, forests need clearing in order to make space for an onshore solar or wind farm to be installed, or
groundwater systems are contaminated, and protected species threatened due to the expansion and/or development of a new copper or lithium mining operation.

Despite my motivation to protect the present and future health of the environment, it is difficult to determine if my efforts to-date have been environmentally beneficial or even sustainable in the absolute sense of the term. Reflecting on the typology of definitions within the literature that pertain to sustainable entrepreneurship, clearly there must be a distinction drawn between environmental and ecological entrepreneurs who are involved in venture creation and those entrepreneurs who are involved in the RE sector. While a comparative study comprising in-person interviews with a broad sample of sustainable entrepreneurs is beyond the scope of this thesis, it would be instructive to know if, like me, entrepreneurs in the RE sector cite among their primary motivations, a concern for the present and future health of the environment. If RE sector entrepreneurship as a practice is still to-be-considered to fall within the definition of sustainable, despite the negative environmental consequences of building and installing RE technology, then sustainable entrepreneurship by definition must be distinguished from environmental and ecological entrepreneurship. It is certainly distinguishable from environmental and ecological activism, even though the growth of the RE sector has benefitted from the efforts of these activists. Similar tensions between profitability and environmentalism existed within the state/market dynamics at play in Scotland. For example, the coalition at work within Scotland’s 2020 Climate Group included environmental conservationists working on behalf of organizations such as Keep Scotland Beautiful and the WWF. These organizations were aligned with the SCCCS and with the Scottish Green Party in support of Scotland’s Climate Change Act (2009), which set ambitious RE electrification targets. These targets, in turn, shaped the opportunity landscape that I was operating in and had a direct influence on the growth of the RE sector within Scotland.

6.2.4 Progressivism and entrepreneurship

Critical political economy prescribes duties to privilege (Gramsci & Buttigieg 1975; Strange 1996; Cox & Schecter 2002; Harvey 2005). The argument can be summarized as follows: rationality, which is always subjective and therefore often instrumental, ought to be directed in favour of those who are not in a position to pursue their own ends freely, on account of poverty, systematic oppression, cultural discrimination, absence of legitimate institutions, or any situation where structures of power deprive individuals or groups of their innate rights to free inquiry and expression. Depending on the context and the positionality of the privileged person or persons who are in possession of ‘powerful knowledge,’ they are obliged to direct their research efforts to ‘liberate’ others who face situations of oppression and/or injustice. That is to say, for those of us including myself who are the beneficiaries of inherently discriminatory power structures, we have an obligation to examine the roots of our privilege and to seek to empower others whose absence of privilege may either directly or indirectly constitute our own.
Looking back on my conversations with Dr Julian Graef, formerly of the Carter Center, the genesis of SCENE was largely borne of a concern for how climate change stands to impact the world’s poorest, as well as a respect for local knowledge and local autonomy. Although my ambition to expand the SCENE service model globally was never fulfilled, our effort to create an online portal with SCENE Connect was motivated as much by a concern about the energy- and climate-related dilemmas facing poorer countries as it was about building a service model that could generate value for local organizations in Scotland. While the SGRF was more inwardly focussed, in terms of the aims and objectives of the organization, arguably the leadership of the Scottish government under Alex Salmond had a distinctly global outlook that helped to shape the opportunity landscape and influence my thinking about how local and global scale social justice challenges were interconnected. As with the original Edinburgh Conversations, there was indeed quite an abundance of activity involving international and interregional organizations that took place in Edinburgh that we had sought to align with throughout Alex Salmond’s tenure as First Minister. Even with CIPA, a technology venture, the conversation was not and has not been limited to applications of the final product in advanced economies only. CIPA could certainly be used to assist government- and RE sector decision-makers in poorer countries with improving the speed and efficiency of their interconnection planning for expanding affordable electricity access to underserved areas. However, as I will explain in the following sections, personal motivation has encountered a state/market reality that has not always favoured progressive action, despite my intentions.

6.2.5 Progressivism and the profit motive

While, as with environmentalism, there is a spectrum of progressivism that incapsulates different normative views toward individual and state/market activity, I am using it in a modern sense to mean the advancement of social causes in the Western pluralist tradition of ‘good governance.’ By this interpretation, private sector participation in society can be deemed progressivist if it favours distribution or investment of profits in social justice initiatives and/or models of collective ownership that include, for example equity sharing as in the case of co-operatives or the funding of causes aimed at advancing the socioeconomic goals of minority groups. Granted, private sector activities such as these may also in cases be designed to obfuscate or deter genuinely progressivist activities. In regard to how progressivist values helped shaped each of the three case studies, the SGRF steering group were at once challenged by inherent tensions between our aim to facilitate conversations on topics of climate change and energy security through fostering cross-sectoral stakeholder collaboration and our need to attract sufficient funding to prove concept and scale the business. I recall there was a palpable hesitancy on behalf of some members not to be perceived as profiteering, irrespective of the business model. It would have been interesting and perhaps beneficial to have involved target customers earlier on in the ideation process and to address these matters directly through dialogue with them, as I had done with SCENE and CIPA.

While the private sector was a target participant and customer, we did not have a private sector representative to help steer us through any of the issue areas we had
sought to address. It was therefore difficult to ascertain whether or not the interested parties we had aimed to serve, from policy-makers and state officials to industry leaders, would have questioned our integrity or accused us of masking our true intentions had we been more explicitly for-profit. We also lacked a central organizing figure with the sort of gravitas and profile tantamount to that which Prof. John Erickson had embodied as the coordinator for the Edinburgh Conversations. Where he had succeeded in bringing together influential individuals on both sides of the Iron Curtain to engage in constructive dialogue on issues of global importance, the nature of the challenges we had set out to address with the SGRF were less clearly defined. Participants in the Edinburgh Conversations were involved in a binary conflict consisting of contrasting worldviews and had a mandate to act in an official capacity on behalf of their governments. This was, at least on the surface, a function of diplomacy, and not of commercial enterprise. In our case we were aiming to create a venture with a repeatable service model and did not have the authority to engage in direct diplomacy, as a sub-state regional entity. Scottish government decision-makers are unable to act in an official capacity in realms of foreign policy, a governance function that is reserved for UK government actors. However, we persisted to attempt to create an alternative pathway for individuals to engage in diplomatic-like dialogue in the belief that those whom we eventually planned to involve from the private sector and from the Scottish government as well would be inclined to participate for the benefit of advancing a sustainable future for Scotland out of a shared progressivist belief in the potential for collective action to achieve mutually beneficial outcomes. This assumption was not entirely unfounded. We had seen the successful formation of Scotland’s 2020 Climate Group, that did involve private sector representatives volunteering their time to find common cause with third sector organizations toward advancing shared sustainability goals. Yet the general view among our steering group was that the 2020 Climate Group was mostly a social activity with limited impact on the target areas they sought to address. While we harboured scepticism of the 2020 Climate Group’s capacity to deliver on its aims and objectives, it was our progressivist mindset and our values-oriented approach to venture creation that resulted in stifling our progress to launch the SGRF.

With SCENE the tension between progressivism and profiteering also impacted the ideation process in a similar manner to that of the SGRF. This is despite SCENE having been conceptualized at the onset as a socially just endeavour. Our efforts to address inequities in the political economic situation of land ownership in Scotland, through collective organization with stakeholders at the grassroots level, could be considered a form of social activism in and of itself. With SCENE we had set out aims and objectives that would help local organizations achieve revenue streams from RE ownership models such as co-operatives, social enterprises, charities, and development trusts that favoured local participation and sought to involve local skills and labour when available. These aims were not limited to Scotland, but rather reflected a general concern for correcting socially unjust conditions of ownership that is often the result of forced displacement (past or present), colonial enslavement, government corruption and/or private sector capture. In many cases where sustainable energy access is only possible for the privileged few, we can find unjust causes at the root of the problem. In most of the so-called developing world, the vast
majority are left to either subsist from fossil fuelled sources of electricity, often at
unaffordable prices, or endure life with no access to electricity at all. At SCENE there
was a clear progressivist ideology embodied in our efforts to create a model that we
imaged could help. Our ambition was to expand the model across borders, which
was contingent on attracting funding resources at a scale beyond those of the ECCI
in the form of grants, or through contract work for CARES loan recipients. SCENE
Connect was a technology solution that was in part designed to act as a social
network that could scale rapidly, at low to no cost of customer acquisition and benefit
from network effects. However, after building the initial prototype and attempting to
onboard our first users, I rather quickly reached the conclusion that SCENE Connect
was not going to attract sufficient capital resources to achieve economies of scale.
Our target customers in local energy organizations, were slow moving, democratically
governed, technologically unsophisticated and at times untrusting of outsiders.
Again, as with the SGRF, our progressivism in the form of attempting to design and
scale a business that could both attract sufficient capital and deliver socially and
environmentally just outcomes failed to do so despite our values aligning to an extent
with those of the state/market context we were operating in.

Ultimately, once private capital had been secured for the SCENE/ SHPL partnership,
I moved on from SCENE to work with SHPL full-time. SHPL, which was a
commercially-focussed organization first and foremost, did not have local stakeholder
participation as a core focus area, but rather sought to capitalize on land inequities
by working directly with landowners in the Highland and Islands primarily, who could
seek to generate revenue from FITs, combined with optimizing tax reliefs. This for-
profit model, which prioritized profit-making over social justice was more ‘successful’
in the sense that it managed to attract private investment rather quickly to achieve
economies of scale. SCENE’s positionality within the SHPL partnership, as it turned
out, was more for marketing purposes. SCENE provided SHPL with a veneer of pro-
local, pro-social justice prioritization. It was my tacit acceptance of this trade-off,
favouring commercial over social justice objectives, that inspired the creation of CIPA
as a pure technology venture on the back of completing my tenure with SHPL.

What I had learned from working with the SGRF and SCENE, and later SHPL was
that ultimately, technology-driven approaches with a clear commercial priority could
attract both capital resources and public sector funding far faster than if social justice
issues were prioritized. Technology in the RE sector specifically, was less risky
compared to project development, in that the software product creation process was
more well defined, efficient, and altogether easier to manage. Teams of software
engineers operate according to narrow criteria, whereas RE stakeholders have a
multitude of overlapping and competing priorities. Alongside these practical
considerations, I justified my deprioritization of progressivist values to myself on
account of the fact that with CIPA I was still doing positively impactful work for the
RE sector generally speaking, which had implications for helping to address the
energy trilemma, while also providing me with more resources on both a personal
and organizational-level. My experience of working day-to-day as an RE project
developer with SCENE and SHPL had also taught me valuable lessons about the
nature of the industry and where projects are helped or hindered depending on how
well they are managed and also the quality of access to reliable information about potential sites. Accelerating RE development with technology can lead to increased employment in the RE sector, which can be considered a societal good. The use of open data to bring greater transparency to the decision-making process around RE planning in a manner that stood to benefit anyone working in the industry, was also societally beneficial. While, at the time of writing, CIPA is not a commercial business and is still in prototype testing phase, I will reflect further upon the lessons I have learned here in this analysis and endeavour to work with colleagues more deliberately to ensure that CIPA can be directed toward aims that improve energy access and may provide affordable, sustainable energy sources in areas of the greatest need.

6.2.6. Progressivism and venture creation

At the state/market level there are myriad examples across the three cases of policy incentives and innovation funding programs implemented by the Scottish government and the UK government that have progressivist ideological foundations. The policy ecosystem involved in working to advance Scotland's climate change and RE goals was diversely constituted, representing a broad swathe of public, private and third sector organizations coalescing around a common cause; that of advancing Scotland’s climate change and RE electrification goals (Kaesehage & Leyshon 2018). A multi-party system, the Scottish parliament’s majority composition during the 10-year period was predominated by the SNP, the Scottish Labour Party, and the Scottish Green Party. These three parties espouse progressivist ideals, though these ideals are manifested practically in a wide diversity of ways and to varying degrees. In general, each hold social justice causes as fundamental to their manifestos and in representing the interests of their party members. Throughout this period, there was clear values-alignment between my progressivist ideology and that which characterized Scotland’s political economy. While the UK parliament was under Tory leadership throughout this period, progressivist elements existed at times within its policy-making as well. Conservative communitarian political philosopher Phillip Blond through his think tank Respublica, had an influence on the policies and politics of former Prime Minister David Cameron (2010-2016). The ‘Big Society’ initiative, which was a core component of David Cameron’s campaign platform sought to promote a localist form of conservatism through private ownership. The Liberal Democrats, who were once in a coalition with the Tory party under the leadership of Deputy Prime Minister Nick Clegg (2010-2015) had been instrumental in setting up the UK Green Investment Bank. Meanwhile, in academia the University of Edinburgh, the PPN and the ECCI as well as its predecessor SAGES were also progressivist in their values. As a key source of early resources for the SGRF and SCENE, the existence of these two organizations proved invaluable for helping to provide a resource base for me to take the first steps toward formulating a plan and carrying out a strategy for each new sustainable venture. That said, the tensions between social justice on the one hand, and profit-making on the other were also evident within the Scottish and UK opportunity landscape.

As a recipient of Innovate UK R&D funding, I have been empowered to work with a team of academic researchers and practitioners on building CIPA. While the details
of the project funding application are confidential, I can say that generating societal impact was not a core consideration of the case for funding beyond the forecasted number of jobs created. However, forecasted GHG emissions reduction, was considered. Innovation funding through bodies such as Innovate UK, which work closely with the UK’s research councils to support R&D are, in my experience, particularly oriented toward the creation of intellectual property as well as economic growth broadly defined. According to the Innovate UK Delivery Plan for 2019-2020, the aim of R&D funding is framed according to five strategic goals:

- deliver measurable economic and societal impact across the UK
- support and invest in innovative businesses and entrepreneurs with the potential and ambition to grow
- maximise the commercial impact of world-class knowledge developed in UK industries and its research base
- identify, support and grow transforming and emerging industries through innovation
- build a coherent, supportive environment incentivising R&D investment and enabling people and businesses to innovate

These strategic goals are not presented according to any identifiable order of priority, rather they are treated as bullet points in a generic framework on Innovate UK’s website. From a surface reading we can suppose that ‘maximizing commercial impact’ in UK industries is as important to the delivery plan as ‘measurable economic and societal impact.’ Economic and societal impact could be considered progressivist in terms of advancing technological solutions to climate change as could support to grow ‘transforming and emerging industries,’ which can include sustainable ventures. Indeed, there are periodic Innovate UK funding calls that target sustainable innovation explicitly. However, the goal of ‘enabling people and businesses to innovate’ is non-explicit in terms of which social groups or what types of businesses, allowing for a broad interpretation. Of course, people in the UK are born to varying circumstances so any interpretation of the aim to enable ‘people and businesses’ must be taken in its broadest possible sense to mean both the privileged and the underprivileged. However, speaking from personal experience with CIPA, the preparation of an Innovate UK funding application is a complex, resource-intensive undertaking, often requiring substantial input from innovation experts with a high level of commercial and/or academic research experience. Such expertise and resources are normally off-limits to the underprivileged on account of systemic power imbalances. Undoubtedly, my own position as a university educated, middle class white male from a Western background has helped me to successfully secure Innovate UK funding, where others must contend with multitudinous forms of discrimination that inevitably holds them back. Suffice to say, the social justice aspect of climate change is not considered in the criteria for accessing Innovate UK funding at the time of writing.

In terms of funding allocation per sector, in 2019-2020 the total Innovate UK budget was ~£667m. The following figures show the distribution of funding per sector for this period:
As the above figures show, the bulk of Innovate UK funding has mostly favoured conventional innovation, with some funding allocated for ‘Clean Growth & Infrastructure’ including offshore RE. Funding allocated to ‘Ageing Society, Health & Nutrition’ may be considered socially impactful, yet it remains unclear to what extent this category is concerned, if at all, with social justice. The UK government are presently set to nearly double the size of the annual R&D budget in 2023 with a target of reaching 2.7% of GDP by 2027, which could lead to more diversified funding allocations in the near future. A recent announcement by Innovate UK also pledges £2.5m in R&D support for “developing innovations centred on equality, diversity and inclusion in their design and development,” under a new ‘Inclusive Innovation Award (2022-2023).’ In terms of addressing social justice issues through venture creation, Innovate UK are not explicitly involved in consideration R&D funding applications beyond this new award. It is difficult to say without further research the extent to which each funding recipient categorized above may involve sustainable innovation initiatives. This would go beyond the scope of the current thesis to explore but would make for valuable additional research. What is clear is that in terms of aligning with progressivist values, Innovate UK as a body conforms to more traditional state/market norms of conventional approaches to innovation that do not seek socially just ends. However, the recent creation of an award dedicated to diversity and inclusion signifies a possible trend moving in a more progressivist direction.

Given that SGRF and SCENE were more service-oriented business models with limited, if any IP under development, both organizations would not have made strong candidates for Innovate UK R&D funding in any case. Although SCENE Connect was a technology platform, novel approaches to software engineering were not required to build it. The SGRF with its focus on roundtable discussions was never a candidate...
for accessing R&D funding, despite that many of the issues that we had sought to address were directly related to supply chain and energy security that in turn, stood to have a significant impact on Scotland’s key industries and the UK as a whole. 

Where Innovate UK funding was unavailable there remained several alternative sources of funding, which we did manage to win and to benefit from. These sources of funding such as the seed grant awarded by the ECCI, and the Scottish government’s CARES loan scheme, which enabled local energy organizations to contract SCENE’s advisory services, were both foundational to the SGRF and SCENE to the extent that, without these funding sources it is possible that neither venture would have ever progressed beyond the ideation stage. It is worth considering the implications of these types of service-oriented business models failing to attract sufficient funding to scale, assuming that this is the case beyond the research presented here. If Innovate UK were to adopt a more progressivist-oriented funding model, this would perhaps serve to further bolster the growth of sustainable ventures designed to address both climate change and related social justice issues. It will be interesting to see how the Inclusive Innovation Award is utilized and what types of business models are awarded going forward. In terms of intellectual property considerations, service models without sophisticated, novel technology innovation will still remain uncompetitive for patents. If intellectual property remains a high priority consideration for Innovate UK, this will potentially continue to prohibit service-oriented, progressivist founders from accessing R&D funding and addressing climate change and social justice needs.

6.3. Conclusion

As with my transition away from environmentalism and toward technology, a similar corresponding trend has occurred in regard to progressivism. Although with the SGRF we were never explicit about our aims to advance social justice causes, the uneasy attitudes among steering group members toward profit-making, reflected the dominant state/market position of Scotland at that time, which was one of progressivist political economics. With SCENE we were more directly engaged with social justice issues that were not only prevalent in Scotland but had corollaries in the wider world. While our efforts were supported vicariously by our interaction with local organizations in receipt of funding from the CARES loan scheme, the SCENE service model and technology product in SCENE Connect were unable to attract sufficient funding to achieve economies of scale. With CIPA, access to both private sources of capital and to Innovate UK funding was successful. The technology-driven approach has potential to achieve economies of scale, however at the cost of advancing positive environmental and social impact. While my motivation has been to use venture creation to catalyze solutions to climate change in a just manner, the need to create products and services that can achieve economies of scale and the related need to attract sufficient capital resources early-on in the venture creation process has ultimately acted as a defining structural feature of sustainable venture creation in Scotland, where my activities were rewarded if they aligned with UK-level state/market definitions of fundable innovation and discouraged if they did not conform with UK-level state/market definitions of fundable innovation.
The political economy of Scotland on the surface provided an ideal context in which to be a sustainable entrepreneur with environmentalist and progressivist ideological leanings. However, the Scottish government’s devolved powers do not permit capital raising independently of the UK government, with its more conservative political economics. This may explain why there are such an abundance of non-profit and social enterprise organizations in Scotland who focus primarily on local issues and rely on philanthropical sources of funding rather than opting to enact new ventures as a catalyst for achieving climate change and social justice goals. Where does this leave sustainable venturing in Scotland? If sustainable venture creation is to be leveraged as a solution to climate change and related social justice issues, then it would seem that the criteria by which innovation itself is measured, must transition away from its conventional market-oriented approach and toward an approach that can account for the enormously negative consequences that ‘business as usual’ will have for the future of Scotland, the UK, and the wider world. This also must be the case for private sector sources of capital, where ROIs must be weighed against the real costs of continuing to invest in new ventures that are ultimately unsustainable. Definitions of what ventures are ‘successful’ versus those which are ‘unsuccessful’ must also evolve to consider the reality of climate change and related social justice challenges.
Chapter 7: Discussion and Implications

The preceding analysis has generated new insights derived from the case study data. When viewed through a critical political economy perspective, discussion of political economic factors is possible and can help to shed light upon how individual and state/market contexts are interrelated and influence the practice of sustainable entrepreneurship. Together, individual motivations and state/market dynamics combine to create the structural conditions that sustainable entrepreneurs must contend with when attempting to build and scale sustainable ventures (Kaesehage & Leyshon 2019; Murnieks, Klotz & Shepherd 2020). As a result of this analysis, we can see that although my ideological foundations as an environmentalist and a progressivist were driving forces that motivated my efforts at sustainable venture creation, the outcome of these efforts was largely mixed in terms of achieving genuinely sustainable results. My ability to design and build product and service models that could attract sufficient funding to achieve economies of scale were inhibited when environmentally and socially impactful outcomes were prioritized. This was especially the case with the SGRF, a service-led model where the steering group’s inability to decide upon a revenue strategy on account of diverging attitudes toward profit-making, rendered us unable to take further steps needed to pilot the initiative. With SCENE, although we had a technology product that helped to support the service-led model, our early customers worked at a slow, deliberative pace that resisted efforts to rapidly improve their access to RE resources. With CIPA, a technology-led model, the venture has attracted both private and public sources of funding and has the potential to scale, but at the expense of achieving environmentalist and progressivist goals.

Tensions between ideological motivation and solutions development in the sustainable venture creation process are elucidated throughout the analysis across each case. At the crux of these tensions lies the question of whether or not entrepreneurs can genuinely achieve sustainable outcomes in a state/market context where intellectual property and jobs creation are prioritized over environmental and social justice considerations (Greco 2020; Rosário, Raimundo & Cruz 2022). Capital resources both private and public favour innovation opportunities with the potential to achieve competitive ROIs through economies of scale. Where intellectual property is strong, investors have an added incentive to take financial risk, given the possibility of achieving ROIs through strategic acquisition by a third party. When successful, technology-driven ventures, especially in software, are well-suited to rapid growth. Software product creation is characterized by relatively efficient, iterative prototype development, end-user testing and the potential for widespread adoption at low marginal cost. Yet, technology-led solutions without a complementary service model may be ill-suited to addressing environmental and social justice dilemmas, creating a conundrum for sustainable entrepreneurs. If service-led models like the SGRF are best equipped to address climate change, but are unable to achieve economies scale, this calls into question the efficacy of sustainable entrepreneurship as a practice. Hybrid solutions like SCENE with a service-led model supported by a technology product could prove viable if the service can quickly reach a wide enough user base with sufficient capital resources. In the case of CIPA, my choice to work in
software required a stricter adherence to state/market norms, and a sacrifice of the environmentalist and progressivist ideals that had once served to ignite a spirit of entrepreneurism within me from the onset.

A summary of the above key findings derived from the case analysis is as follows:

<table>
<thead>
<tr>
<th>Case study</th>
<th>Timeline</th>
<th>Findings</th>
<th>Evidence</th>
<th>Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>SGRF</td>
<td>2009-2010</td>
<td>Geopolitical tensions between Scotland &amp; England; SNP-led sub-state climate diplomacy shaped the opportunity landscape; fostered helpful resources; enabled choice of business model; limited options to scale</td>
<td>SNP energy politics; Scottish government-backed stakeholder ecosystem/ policy leadership; difficulty monetizing mediation in area of UK reserved powers</td>
<td>Political economic factors of resource competition; balance of constitutional powers frame entrepreneurial choices/ processes in RE sector</td>
</tr>
<tr>
<td>SCENE</td>
<td>2010-2014</td>
<td>Geopolitical tensions between Scotland &amp; England; SNP-led land reform agenda shaped the climate opportunity landscape; fostered helpful resources; enabled choice of business model; limited options to scale</td>
<td>CARES loan scheme supporting Scottish local RE equity; no equivalent UK-wide scheme; difficulty growing consultancy model beyond Scotland</td>
<td>Political economic factors of land ownership; balance of constitutional powers frame entrepreneurial choices/ processes in RE sector</td>
</tr>
<tr>
<td>GIPA</td>
<td>2014-2019</td>
<td>Tensions in UK innovation policy between/ technology-led growth and positive social/ environmental impact fostered helpful resources; enabled choice of business model; limited climate impact; created options to scale</td>
<td>Innovate UK funding for RE/ digitization led to successful prototype creation; no equivalent funding for social/ environmental impact</td>
<td>Political economic factors of innovation policy favoring industrially-intensive growth over pro-climate goals frame entrepreneurial choices/ processes in RE sector</td>
</tr>
</tbody>
</table>

Table 3.3: Key findings, evidence & contributions

Rewarding private investors, including policy-makers and government regulators, for taking early-stage financial risks when supporting new ventures with the potential for competitive ROIs is not necessarily a hindrance to sustainable venture growth. Indeed, the RE sector has benefitted greatly from subsidization and tax incentives and could not exist without such support as well as pioneering investments from private investors that have historically carried significant financial risk. However, attitudes toward risk and reward are confined to the domain of instrumental rationality. Individuals make decisions every day about what quantum of ROI is appropriate for the financial risk taken, as well as defining what criteria are to be included in account for risk. Achieving high profits through accelerated growth at the expense of the health of the environment and of society is an extreme ideology championed by neoliberalists whose motivations favour short-termism and a preference for deregulation in opposition to policy intervention of any kind in so-called free markets. Such an ideology stands in direct competition with sustainable venture creation that operates according to ethical principles out of concern for the future of people and planet. If sustainable venture creation is to be supported, then individual investors and policy-makers must genuinely adopt progressivist and environmentalist viewpoints and put them into practice. Prevailing conditions in Scotland, where these viewpoints are reflected in the culture of many private, public and third sector organizations, were friendly to sustainable venture creation. But as a devolved entity within the greater UK, there are policy limits to what the Scottish government can achieve. The UK government compared to the Scottish government has consistently endorsed neoliberal economic policies both domestically and internationally. The legacy of such policies can be observed in the UK government’s innovation funding programs where resources are available to those entrepreneurs residing in the UK who are in a privileged position to design competitive funding applications and where R&D funding awards are tailored almost entirely to market-oriented growth that is
conceptually divorced from political economic reality. Developing a deeper understanding of the political economic dynamics at play within Innovate UK would make for valuable additional research that can further be of use for extending the depth and scope of my analysis on this latter point.

In terms of defining success, the RE sector in Scotland has benefitted significantly from the environmentalist and progressivist leanings of its political economic actors across public, private and third sector organizations. Sustainable entrepreneurs like me who were enacting sustainable ventures in the RE sector in Scotland throughout this period (2009-2019) had access to a uniquely resource rich environment where policy-making came together with private industry to help lead Scotland to becoming the first country in the world to meet 100% of its electricity needs from RE sources. Granted, without the UK government providing subsidization in the form of FITs and ROCs to incentivize RE generation, the Scottish government would have had limited options to design and implement similar measures. RE solutions in Scotland, and the policies designed to help support their growth, have also been advanced as a direct result of activist groups and coalitions of non-profit organizations. Another valuable follow-up study to this thesis would be to carry out an assessment of different attitudes and ideologies at play within Scotland’s climate, environmental, and ecological organizations. Specifically, I should like to learn more about the perceptions of activists toward the RE sector and their understanding of the extent to which they see RE as a viable means of addressing climate change in its many facets.

I have reached the conclusion here, on the back of the preceding analysis, that despite the commercial success of the RE sector in Scotland, the initial problem of climate change in its multiple facets is not sufficiently addressed by RE solutions. Although RE technology can help to offset GHG emissions, displacing fossil fuels and providing an investible asset that can generate competitive ROIs, they are at least inadequate and at most a contributing factor aiding in the destruction of carbon sinks and accelerating the demise of natural ecosystems. While far less environmentally destructive compared to other fuel types used for generating electricity, the RE sector does still heavily rely on critical materials, as well as fossil fuels, for their manufacture and distribution. As discussed in the preceding analysis, RE technology lacks genuinely sustainable credentials, and yet is a critical technology being supported by policy-makers, industry and third sector organizations. If we are to protect the planet and both human and non-human populations from mass extinction, the way in which energy is produced and consumed must be transformed entirely to exist harmoniously with natural ecosystems. RE solutions are more sustainable when they are more distributed, smaller-scale and when there is an ownership component that helps to provide an income stream and source of security for local stakeholders. While still not environmentally sustainable, distributed RE solutions are socially sustainable, and complementary to the aim of combatting climate change.

There is clearly a need for new criteria to be developed by which ventures can be determined successful or unsuccessful. The optimal venture would achieve economies of scale, generating sufficient ROIs for investors without contributing to
climate change, social injustice, destruction of carbon sinks, or endangerment of natural ecosystems. It may indeed be the case that no such venture is possible with the availability of current technology. Although new technological advancements in the form of Artificial Intelligence, quantum computing, bioengineering and quantum materials design are all leading to fascinating trends in innovation that may sometime in the not-too-distant future, enable entrepreneurs to create new ventures that are optimally sustainable, at the time of writing I am struggling to identify a single example of a company with a product or service line that perfectly meets all of these criteria. Yet, when we observe nature, we see everywhere that non-human species exist and have existed sustainably, some dating back hundreds of millions of years. Non-human species such as chimps, elephants, crows, whales, dolphins, and cephalopods have evolved relatively sophisticated levels of intelligence without causing any discernible negative impact to their natural environment. The existence of such species provides evidence of what is possible over the course of very long periods of biological trial and error. Unfortunately for humans, our trajectory is such that we do not have millions of years to learn how to effectively adapt to life on earth.

There are limits to adequately providing a fully comprehensive response to the research questions that warrant further consideration and research. While I am arguing that sustainable venture creation is helped or hindered by ideological contests within the organizational bodies that are designed to fund R&D at state/market-level, a follow-on reflexive autoethnographic study or ethnographic study to determine how these ideological contests play out in practice within Innovate UK would be beneficial. Additional case studies derived from the experiences of other sustainable entrepreneurs in Scotland, and throughout the UK would provide useful data that can be cross-analyzed to tease out insights that are inaccessible in this thesis given the reflexive autoethnographic methodology I have employed. Unstructured interviews with sustainable entrepreneurs within and outside the UK could also help to shed new light on how different state/market contexts may result in different outcomes. As one of the primary aims of the research is to develop a methodological framework that can be used by researchers and practitioners to capture and share evidence from their experience of enacting sustainable ventures, it would also be beneficial to expand the methodology chapter here into a publication that can be peer reviewed and, if published, disseminated for discussion at academic conferences and in conversation with various communities of practice.

Below are some questions that have arisen throughout the course of this PhD thesis that may make suitable candidates for further research:

- What, if any, political economic factors shape the criteria by which Innovate UK decides which R&D projects are awarded funding?
- How, if at all, do the motivations of ecological, environmental, and sustainable entrepreneurs in the UK differ from one another?
- How do founders and executives of RE firms in the UK measure their environmental and social impact?
• How do VC funds and Corporate Venture Capital funds in the UK evaluate sustainable ventures for investment?

• What criteria do Venture Capital funds and Impact Investment Funds use to determine the investment-worthiness of sustainable ventures?

• How do service-led, product-led and hybrid business models perform in the sustainable energy sector across England and Scotland?

• How do service-led, product-led and hybrid business models perform in the sustainable energy sector across the UK and California?
Chapter 8: Conclusion

In this thesis I have employed a reflexive autoethnographic method and case study approach in order to critically examine the underlying motivations and processes at play in pursuing venture creation as a catalyst to address the global climate crisis. As a sustainable entrepreneur myself, I have developed a methodological innovation which can account for the significant time and resource constraints that are characteristic of the venture creation process, so that other entrepreneurs may be empowered to document and share case studies and reflexive self-analysis detailing their rich, lived experiences of sustainable venture creation in specific political economies. Reflexive autoethnography when accompanied by a case study approach solves for the problem of 'infinite contexts' by limiting the scope of relevant data, enabling practitioners to focus their efforts on sharing a truer picture of the personal and structural realities they face. It is my hope that this methodological innovation can aid further research and policy-making aimed at advancing sustainable solutions to the climate crisis. Furthermore, through the lens of critical political economy, the individual-level and state/market-level tensions that shaped the opportunity landscape and defined my experience of sustainable venture creation have been captured in unique depth and reflexively assessed according to the ideological objectives I set forth to develop sustainable solutions in the RE sector that are both environmentally beneficial and socially-just. Sustainable entrepreneurs are embedded in a neoliberal political economic system that rewards unsustainable practices. The process of sustainable venture creation must therefore take in account the unique set of political economic factors that shape the opportunity landscape where they reside.

In the case of Scotland, the geopolitical tensions inherent to relations with England in regards to climate diplomacy and land ownership played a significant role in both creating and limiting opportunities for myself and my partners to design business models that could scale effectively. My resulting analysis shows that in the UK RE sector, even under ideal conditions in terms of my privileged positionality and access to supportive policy frameworks, partnership ecosystems and funding, there are still significant challenges to delivering genuinely sustainable outcomes on account of political economic realities that are characteristic to the UK and to neoliberal thinking within institutional contexts in general. The example of Innovate UK providing direct funding support for RE and digital innovation, while not simultaneously providing direct support for environmentally and socially-just innovation should give pause for thought to any sustainable entrepreneur currently planning to build their business in the UK and seeking public sector funding to help offset some of the early-stage risks. At the time of writing, they will be forced to compromise on some of their ideological goals in order to adapt their solutions to guidelines that are strictly conventional in terms of their lack of support for more environmentally and socially beneficial outcomes. Policy-makers may be well-positioned to redesign government programs so that environmental and social benefits are targeted as outcomes of financial support, rather than accommodations that are secondary to profit-making. However, at a structural level, neoliberal orthodoxy still governs state/market decision-making,
while on an individual level the path of least resistance to achieving entrepreneurial success is still defined by one’s willingness to attain profits often at the expense of both environmental and society.

Sustainable venture creation is a normative project, situated within a political economic context. In understanding the threat of climate change, researchers and practitioners who participate in the process of enacting sustainable solutions, share a common aim to transform society in a way that they hope will help to preserve planetary health for the sake of future generations (Kaesehage & Leyshon 2019; Murnieks, Klotz & Shepherd 2020). In undertaking such efforts, they must contend with the state/market dynamics at play that define the opportunity landscape they are operating in and shape their practice. For the field of entrepreneurship research, developing a detailed understanding of how individual entrepreneurs perceive the problem of climate change, and how their contexts and motivations may differ, and/or overlap is crucial for shaping the future of both the field and the practice. In addition, gaining an understanding of how the state/market dynamics at play in a particular case, can advance or hinder sustainable entrepreneurs along their journeys, can aid policy-makers who are keen to see an increase in the number of sustainable ventures being created. The reflexive autoethnographic research method has the advantage of enabling empirical evidence of experience to be captured and assessed in great detail. When complemented by a case study approach, this method may become transferable and usable by others, thus creating a new possibility for valuable new knowledge to be created and shared for use in comparative analysis.

In sharing stories from my personal background, as well as providing a detailed description of each sustainable venture created within the state/market context at play, I have sought to identify common themes that prevail throughout each case and which had a significant influence on my practice. In the absence of perfect objectivity, my action-orientation seeks to create new, valuable knowledge for a specific use: to advance the cause of sustainable venture creation as a viable catalyst to effectively address the climate crisis. Political economic factors of analysis have also been largely excluded or ignored by much of the sustainable entrepreneurship literature to-date. Theories derived from economics and management studies often sidestep the reality of power and ideology at work in human affairs. The effort to present their research as value neutral is problematic. If our shared goal as researchers and practitioners is to increase the number of sustainable ventures created, then a true and accurate description of the most detailed aspects of the sustainable venture creation process is necessary. It will also not help policy-makers to consider the positioning of sustainable entrepreneurs as resting on equal footing as that of conventional entrepreneurs who do not consider addressing climate change to be a goal of their venturing or may consider any positive environmental and/or socially just output as secondary to maximizing profits for themselves and for their shareholders. Granted, the case study approach taken here is highly individualistic, and favours depth of detail over volume of cases. We do need more case studies and more empirical evidence captured from the experience of sustainable entrepreneurs if we are to begin to truly understand their aims and motivations and to assess how these
may differ or align with those of conventional entrepreneurs at both the individual- and state/market-level.

Entrepreneurship is a visionary experience, where the individual must set out to relentlessly pursue opportunities that are partly defined by the time, place, and space of their surroundings. When it comes to envisioning a sustainable future, there are also principles of practice that limit the choices that an entrepreneur can make if they are to remain truthful to fulfilling their vision. In addition to their actor-positioning of race, class, gender, sexual orientation, ability, the extent to which they adhere to precepts of this latter aspect is a deeply personal subject, revealed only to the external observer in hindsight, if at all. Sustainability as a concept is contested terrain, with some entrepreneurs likely to be more considerate of what truly constitutes sustainable choices and actions than others. Their actor-positioning will also frame their interpretation of as well as access to sustainable choices; a research topic that is worthy of additional consideration in further research. Evidence of the extent and measure of one’s adherence to sustainable principles throughout the process of enacting a sustainable venture is almost entirely confined to the entrepreneur’s inner world where only they may have the opportunity to reflexively evaluate their own actions. If presented with empirical evidence, researchers may seek to assess where and how their actions lie along a sustainability spectrum.
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