The Construction of Quebec's Green Economy

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ABSTRACT

On the Construction of Quebec's Green Economy

Jessie Smith

The green economy is a new economic paradigm, which has become increasingly popular in light of recent UN publications and the 2012 Rio + 20 summit. But what are the implications of this development? In order to answer this question one must re-think "the economy" as social construction rather than the self-evident object (Mitchell, 2006). While economic experts and the state perform the economy they simultaneously define what is considered "non-economic": a status that makes life precarious for those human and nonhuman factors that are valued in this way (e.g. the environment) (Mitchell, 2010). Since 2008 the Quebec government has been developing their own green economy. The major result of this initiative has been the creation of an organization called "Ecotech Quebec" (otherwise known as Quebec's clean-tech cluster), which is responsible for defining and promoting Quebec's green economy. Through twenty five semi-structured interviews, a document review, and visual analysis this in-depth case study examines the process by which Quebec's green economy is being constructed. More specifically, this research sheds light on the ways in which Quebec politics and economics are performing the green economy; exposes the socio-technical mechanisms that have contributed to this project; and reveals what has been excluded from this representation. This research will therefore contribute to the debate about whether or not the green economy initiative will center on the appropriate transformations necessary to ameliorate the contradiction of capital and ecology, or if it will result in technological fixes and business as usual.

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"To see what is in front of one's nose needs a constant struggle." - George Orwell

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Introduction

The environmental movement emerged in North America as the ecological crisis resulting from capitalist modes of production were gradually exposed via environmental activism and various state led investigations. While early environmentalism resulted in large scale conservation and preservation projects, this growing awareness bubbled over into more wide scale protests and activism in the 1960s and 1970s, which eventually led to the adoption of stricter environmental regulations in both the US and Canada. Today, environmental issues such deforestation, loss of biodiversity, energy use, and climate change have become important societal concerns and the proliferation of environmental friendly programs, electric vehicles, organic produce, and other "green initiatives" is ubiquitous. This movement has also given rise to a global debate regarding the use of alternative energy sources (solar, wind, and biofuels) as opposed to destructive fossil fuels production, even as these alternatives continue to be undermined by government policies and oil industry opposition (Suzuki, 2012).

Regardless of this growing awareness, many of the environmental policies of the late 20th century have been dismantled in favour of neoliberal regimes of deregulation, competition, and free markets (Prudham and McCarthy, 2010; Prudham, 2004). In Canada, the Harper administration has systematically removed environmental policies via clandestine omnibus bills, while continuing to support tar sands development and other environmentally destructive practices. In November 2012 these actions spurred the Idle No More movement where First Nations groups and other Canadians joined forces to protest these changes. Other major development projects regarding the imminent construction of the XL and Northern Gateway pipelines have sparked an ongoing controversy both in Canada and the US (The Canadian Press, 2013). In 2013 the Harper

government was also widely criticized for the continued promotion of the GMO industry (despite many countries banning the presence of the Monsanto juggernaut), denying evidence of climate change, in addition to accusations of muzzling environmental scientists and oppressing research via audits, funding cuts, and other tactics (Gatehouse, 2013).

While environmental protection in Canada and the US has been effectively undermined, the concepts of sustainable development and the green economy, on the other hand, have made their way into the mainstream policy initiatives and political discourse (Bohm, Misoczky, and Moog, 2012). Sustainable development, which is most commonly defined as "development which meets the needs of the present without compromising the ability of future generations to meet their own needs," first emerged at the UN hosted Rio Summit in 1992 (The World Commission on Sustainable Development, 1987). In 2012 the Rio + 20 follow up conference, showcased the green economy as a new paradigm that provides a dual solution for environmental issues and economic growth (Jessop, 2012). While radical interpretations of the green economy may in some cases be progressive (see Shear, 2010), other interpretations highlight its inherent contradictions: it claims to green an economy that is based on the need to continue to expand and grow (Foster, 2002). Likewise, many have argued that these concepts have entrenched the view that neoliberal, market based solutions (i.e. carbon markets/trading) are best suited to address environmental problems, when in reality they simply mask business as usual activities and allow for unaltered economic growth (Bohm, Misoczky, and Moog, 2012).

Green economy strategies have recently made their way to Quebec. Since 2008 the province has been working to promote their green economy through programs to develop electric cars, clean technologies, bio-fuel operated transportation, among other initiatives

(Government of Quebec, 2012). More specifically, at the municipal level the local government has created a clean-technology cluster, Ecotech Quebec, that is showcased as a central project in their plan to make the province a leader in both the green economy and clean technologies (Ville de Montreal, n.d.). With a goal to accelerate Quebec's transition to a green economy by the promotion of sustainable clean technologies, this cluster orchestrates a variety of activities, such as information seminars and networking sessions, to support and promote this nascent industry (Ecotech, 2013). A focus of this thesis is an analysis of the cluster and its activities.

This research draws on the literatures of economic performativity, actor network theory, economic history, neoliberal natures, and greening capitalism in order to understand how Ecotech works to construct Quebec's green economy imaginary. Through a detailed case study of this organization, I illustrate how a particular green economic representation has come to define the cluster – one that draws upon green activities, discourse, and images yet privileges economic considerations and a capitalist agenda. As I will show, these actions are made possible via a process of inclusion and exclusion, which draws on UN environmental discourse and neoliberal economic theory to arrange clean technologies as Quebec's green economy — a process that simultaneously suppresses more transformative visions of this new economy.

For the purpose of this analysis, neoliberalism is defined here as the extension of market principles to public goods and services (e.g. nature). It can take the form of market-based governance, whereby solutions for environmental concerns are addressed by private sector enterprises and through market allocation, use and regulation (see for example Harvey, 2005). With regards to the environment, however, market-based solutions, when not balanced with environmental and social considerations, can heighten

degradation and inequality (Bohm, et. al, 2012). The reason for this is that there is a lack of incentive on the part of private sector actors to reduce environmental degradation and internalize environmental costs (e.g. pollution or resource depletion), and this in turn has served as a rationale for public sector regulation or involvement.

This thesis will begin with a review of the relevant literature where I will discuss the various theories which have informed this study. Here I will start with a discussion of economic history as this will compliment the second part of the section, which focuses on economic performativity. This will be followed by a review of the green economy literature, which will provide a greater understanding of the context from which Ecotech has emerged. In the second part of this thesis, I will discuss the research questions, objectives and methodology used to examine this case study and to steer the direction and scope of the research. Third, I will begin to present my findings with a detailed description of the development of cluster policy in Quebec and at the municipal level, as these policies have greatly influenced the creation of Ecotech. This will be followed by a discussion of the creation of Ecotech by exploring the various actors involved in this group, which highlights the ways in which they have appropriated key terms, leveraged resources and mobilized critical networks to mold green economic representations and stabilize their project. Here I will also reveal some of the tensions in Ecotech's imaginary by exploring the implications of the boundaries that are drawn and their potential limits for promoting a progressive economic, social, and environmental transformation. Finally, I will conclude with a synthesis of my arguments and suggest potential areas for future research.

Chapter 1: Literature review

"I believe that studying economic history and the history of economic thought is an inherently subversive undertaking. It refutes the assumption the capitalism is "natural" and hence ever-lasting, and the related claim that economics is the neutral, technical study of that natural ever-lasting economy (Stanford, 2008).

The origins of "the economy"

The economy is a concept that has dodged the postmodern critiques that many other social concepts have been subjected to (e.g. the deconstruction of universal concepts and definitions in the search for real albeit hidden meanings and difference) (Lourdes, 2003). This is not because the economy is "older" or more "basic" than other concepts, for instance, nor because "it is still thought to refer to a material substrate, a realm with an existence prior to and separate from its representations, and thus to stand in opposition to the more discursive constructs of social theory" (Mitchell, 2010, p. 84). Instead, the economy emerged during the 1930s -1950s – making the concept rather young – during a period that "accompanied and interacted with a broader discursive change in which political and social practice constructed a new object" (Mitchell, 2010, p.91). The latter object refers to "the economy", which appeared as a timely remedy for the crisis of representation caused by the massive political and financial crises that dissolved the monetary systems of several nation states, and that led to widespread unemployment and social unrest during the early twentieth-century (Mitchell, 2010). In response to this unrest, the economy emerged as a steadfast "field of operation for new powers of planning, regulation, statistical enumeration and representation" (p.91), from which a new scientific expertise emerged, cumulating in the establishment of a council of economic advisors in the U.S and the official entry of the economy in political discourse in the mid 1940s (Mitchell, 2010).

So if the economy is a new concept, but the term itself is not, what did it refer to before the 1930s-1950s, what does it mean today, and how did it get this way? In this section I will present a number of perspectives, which can begin to answer these questions and that will ultimately show that not only did "the economy" emerge during a discursive period, but the term itself, like all other social theory, is discursive. In other words, the concept "the economy" is a social construction; however, it seldom appears as such.

Today we conceptualize the economy as a kind of self-contained sphere or calculable object, which can be deflated by micro-economic decisions, transformed by catastrophic events and that is governed by the market. However this particular representation only emerged during the late 1930s (Mitchell, 2010). Before this period, "economy (usually with no definite article) referred to the proper husbanding of material resources or to proper management - of the lords estate, for example, or the sovereign's realm. The term referred to a way of acting and to the forms of knowledge required for effective action" (Mitchell, 2006, p.1116). On the other hand, political economy referred to "the knowledge and practice required for governing the state and managing its population and resources" (Mitchell, 2006, p.1116). These two concepts described different aspects of economic activity, but they did not refer to the economy as a self-evident object. In the following section I will illustrate some of the key ideological shifts of the late 1800s and early 1900s that contributed to the latter construction, particularly the rise of modeling; econometrics; and Western Science.

Economics was once more of a verbal tradition, rather than the quantitative field that we are familiar with today (Solow, 1997; Morgan, 2003; Mitchell, 2006; Mitchell, 2010). This can be explained, in part, by the marginal revolution of the 1870s (Mitchell, 2010; Morgan, 2003; Lourdes, 2003). Prior to this movement, the "English classical

emphasis" viewed labor as the key factor in the valuation of commodities, whereas marginal theorists came to understand value as determined by consumer demand (Morgan, 2003). What is significant about the rise of marginal theory is that it involved the application of mathematics to economics for the first time (Morgan, 2003). This was seen primarily with the "joint mathematical trajectories" of Jevon's calculations concerning consumer behaviour and Walrus' less psychological theories of general equilibrium exchange economy (which involved aggregate calculations of the transactions of both sellers and buyers) (Morgan, 2003).

The use of mathematics in economics had a major impact on the discipline's concepts and tools, but it also changed the kinds of questions that were asked and how they were formulated (Morgan, 2003). This is because mathematics allowed for the imagination of "perfect competition" and other abstract situations, which viewed the economy as a "highly idealized, complex and formally abstract" entity (Morgan, 2003, p.285). Although many criticized the application of mathematics in economics, the trend ultimately prevailed, and in the early 20th century neo-classical economics consisted of classical theories of supply and marginal theories of demand, which were understood through the mathematical equations of Walrus and Jevons. As Morgan (2003) argues:

> "This approach continued to gain credibility through the first half of the twentieth century, as the characteristics of what was to become the full-fledged neoclassical economics of the third quarter of the century – namely, formal treatments of rational, or optimizing, economic agents joined together in an abstractly conceived free-market, general equilibrium world – were worked out. This abstract account became widely adopted to the exclusion of other approaches, however only during the second half of the twentieth century" (p.279).

Popularized by econometric approaches (discussed below), modeling and tool-based economics also contributed to institutionalizing the application of mathematics to neoclassical economics (Morgan, 2003; Mitchell, 2010). Solow (1997) exemplifies this point in describing the difference between the discursive economic textbooks of the 1940's and today's version of the literature, which is packed with models and diagrams. At first glance one would think that the latter suggests major advancements in the utility of new economic methods; however, as Solow (1997) argues, in reality it is quite the opposite. Instead what we observe is just model-building, which Solow (1997) defines as "a deliberately simplified representation of a much more complicated situation (…) the idea is to focus on one or two causal or conditioning factors exclude everything else, and hope to understand how just these aspects of reality work and interact" (p.43). Although seemingly more rigorous and objective, Solow (1997) argues that "modern mainstream economics consists of little else but examples of this" (p.43). This has to do with the fact that economists generally maintain such strong convictions about their scientific tools and practices that they fail to ask the empirical questions which would be required to probe greater explanations of their analysis, a complex Lourdes (2003) refers to as "scientific autism."

To properly understand the development to modeling, Solow (1997) argues that one must consider the emergence of two practices: data collection and econometrics. Around the same time that mathematics was applied to economics, the drive to collect and measure data also began. As Morgan (2003) illustrates, "measuring the output of iron, a basic product of the late nineteenth century, required collecting data from many different firms and deciding on appropriate methods of aggregating them to form one series of measurements" (p.281). Thinking statistically, policy makers, academics, and economists

alike began to collect the necessary data for their projects and measurement schemes. However, it wasn't until state agencies were scrambling to patch up the financial disaster of the Great Depression that these practices were institutionalized. By the 1950s Western governments had accumulated a plethora of official data and "rarely since then have economics set out to take their own measurements" (Morgan, p.283).

Statistics laid the foundation for model building, as the latter practice required a solid reservoir of information to draw from — one that would expand extensively as more economists adopted the practice. As Solow (1997) argues, this is because "facts ask for explanations and explanations ask for more facts" (p.47). Mitchell (2005) shares a similar, yet more critical view of how facts build off of one another. In discussing how economics uses the real world for its natural experiments, Mitchell (2005) describes how this practice "typically depends upon some prior political intervention, in other words a project or experiment of some sort, which arranges the socio-technical world in a way that offers further opportunities for experimentation" (p.316). Therefore, economic facts can build off of one another, which is problematic because the "already existing", seemingly objective data is not always unbiased, "natural" or free from dominant economic ideologies (Mitchell, 2010). Therefore, although facts provide the necessary variables for model building, the origins of this data needs to be considered, which is not always the case.

Second, Morgan (2003) defines econometrics as "an international movement of the interwar period committed to both statistical and mathematical methods and to their union with economics, so that economic relations could be expressed in a rigorous form and measured" (p.286). Similarly, Mitchell (2010) defines econometrics as "the attempt to create a mathematical representation of the entire economic process as a self-contained and dynamic mechanism" (p.85). While both Mitchell (2010) and Morgan (2003) trace the

emergence of econometrics back to marginal utility theory, they also touch upon how physics was the precursor for the latter revolution. According to Mitchell (2010) the imagery, vocabulary and metaphors from physics are what inspired the work of physicist Tinbergen to construct his theories of econometrics, which eventually gave rise to the modern sense of "the economy."

A trained physicist, Tinbergen was the first to construct a model to represent the entire economy in 1936 (Mitchell, 2010). This was the same year that John Maynard Keynes published his influential work the General theory of Employment, Interest and Money, from which the term macro-economy was born. As macroeconomics is concerned with aggregate calculations of transactions within a singular economy with state boundaries as its limits, the parallels between these two approaches is clear. Moreover, whereas Tinbergen developed his models as solutions to the depression in Holland, Keynes constructed his theories in response the Great Depression in North America (Mitchell, 2010). Therefore the construction of these theories did not emerge solely through Keynes and Tinbergen's creativity. Instead, the success and diffusion of their work was also related to the political atmosphere and financial crisis of this time period, which caused the state to search desperately for innovative solutions to these problems (Morgan, 2003). Ultimately, the work of Tinbergen and Keynes and the previously discussed evolutions in economics built the foundation for the network of relations that would come to define the economy as an object (Mitchell, 2010).

Finally, it is important to link the construction of "the economy" to the development of 16th and 17th century Western Science as this ideology gave rise to a view that saw "the world as a machine, made up of isolate pieces of physical matter; human beings as separate from and superior to the rest of the natural world; and the

purpose of human intelligence is to subdue and control nature" (Brandt, 1995, p.7). The diffusion of this worldview led to three key developments worth mentioning here. First, modern science involved an obsession with numerical measurement, which broke up parts of the world into calculable, separate, and objective objects and led to a belief that values and social goals could be quantified. Second, this period also gave rise to masculinity and the consequential domination and oppression of women as it was imagined by idealized male figures that embodied the "ability for precise calculation and unbiased, rational thought" (p.8). Last, this period also involved the proliferation of these white, masculine, and Western theories to all "other" parts of the world. Dichotomous western thinking defined the other (nature included) as subordinate to these beliefs, which let to the violent hierarchical oppression of those (e.g. non-white and non-Western) who did not fit into modernist standards. Thankfully, since roughly the 1980s postmodern theorists have deconstructed several of the above ideologies, which has made room for more equitable views concerning gender, the environment, and the economy for that matter (Brand, 1995). That said, modernist/Western scientific thought has by no means dissolved and still plays a prominent role in political, environmental, and economic discourse globally.

This section presents a brief sample of the theories and people, which have contributed to the view of the economy as an abstract and quantifiable object. Of course this review only skims the surface of the context from which the economy emerged; however, my primary goal was to understand and explain when this construction began and why, as well as some of the tools, which helped it along. The literature also only touches upon a period from roughly the late 1800s to the mid-twentieth century, even as there are many more contemporary processes which undoubtedly contribute to the crystallization of the theory and power of "the economy"; however, one could argue that

the field of economics today simply props up this paradigm as opposed to needing to construct it. New ways to calculate and understand the economy are constantly emerging and evolving, but the dominant view of the economy as an object has been largely unchallenged, therefore this is why I chose to focus on the period in which it was first discursively constructed.

The Divisions of the economy

"If you cannot measure it, it doesn't exist'' — Bené Brown

Figure 1. The economic iceberg shows what is "excluded" from the current economic paradigm (Cameron & Gibson-Graham, 2003).

As we have seen, the construction of the economy required a significant amount of time and creativity to define its representations and metrics. However, insofar as this task requires identifying what is economic, it also involves identifying the non-economic (Mitchell, 2010; Cameron & Gibson-Graham, 2003; Waring, 1999). As Mitchell (2010) argues "to fix a self-contained sphere like the economy requires not only the methods of counting everything within it, but also, and perhaps more importantly, some method of

excluding what does not belong" (p.92). In this section I will present the literature that explains how and why certain aspects of society become legitimately "economic" while others do not, the problems related to this decision-making, as well as the difference (or lack thereof) between social and rational economics.

Mitchell (2010) explores two realms, which are considered non-economic: the state and the household. According to Mitchell (2010), "the state presents itself as the site of the modes of planning and regulation that take the economy as their object. It is also the apparatus principally responsible for constructing representations of the economy, by defining, gathering and publishing economic data" (p.92). It is also responsible for sketching the geopolitical boundaries within which economic activity takes place and managing its currency, for instance. Although, the state is to be understood as separate from the economy, since the economy could not exist without its regulations and representations the exclusion of the state from the definition of the economy would appear arbitrary (Mitchell, 2010).

The second non-economic realm that Mitchell (2010) examines is the household. This sphere refers to the unpaid mostly "feminine" work of child-rearing, cooking and other housework, which although essential in maintaining the well being of individuals, remains invisible because the work is unpaid (Mitchell, 2010). The use of public transit vs. walking also exemplifies this reality. Whereas both methods of transportation will get you to the same place, since you pay for a bus ticket, public transport is considered economic, whereas walking is not (even if you are walking to work). Mitchell (2010) only briefly touches upon the household and the state as examples of the non-economic; however, Massey (1988) (and many others) examine the household as her main subject in the study of what she similarly deems "the divisions of the economy" (p.257).

Massey (1988) explores this invisible sphere by illustrating the changes in valuation of household work in the UK. As Massey (1988) argues academic literature and policy today typically identify household work as separate from the economy; however, the political discourses of WW2 reveal an alternative perspective. During the war women were needed to work, therefore government support for childcare and other necessary services were readily available. This meant that policy, and those writing it, acknowledged that such services were required in order for women to enter the workforce. It is important to note that this temporary ideological shift also occurred due to a change in the meaning of productivity (Massey, 1988). Whereas subsidizing child care is now largely viewed as an unproductive burden on the state, since during WW2 women were in fact working in a realm that produced profits, these subsidies were viewed as productive. This last point shows how there are multiple "divisions" or boundaries at work in constructing the contemporary economic paradigm that are constantly evolving depending on the political climate or the object of the economy. Massey's (1998) arguments also begin to shed light on how such divisions and representations can make life precarious for certain members of society.

Brandt (1995) also discusses how household work gets left out of the economy; however, her analysis includes a discussion of the environment as another victim of "economic invisibility." Economic invisibility refers to "how the modern economic paradigm denies the value of, or makes invisible, the economic contributions of socially devalued individuals, groups, and activities " (Brandt, 1995, p. 23). Although the natural environment provides us with our most fundamental needs, such as clean air and water, these elements according to the economy have zero economic value (Waring, 1999). The only point in which they could acquire monetary value is if they are commodified, which

we see today with the creation of carbon markets for example (Moog et. al, 2012). As a result, companies legally pollute and degrade nature as "any harm caused by a business that doesn't directly affect that business or the people who buy its products is technically defined as an externality," and is not traditionally held against that business by law or accounting systems" (Brandt, 1995, p.). This results in the downloading of environmental issues onto communities, volunteers, and/or women as opposed to those who are actually responsible for them. But how can something as essential to our needs as the environment be viewed nothing more than an externality?

This problem is also related to what Brandt (1995) terms "economic addiction", which refers to "the inability to set limits on or say no to our economic activities" (p.3). It is also related to the fact that the health of the economy is determined by the GDP (Gross Domestic Product), which is said to "represent the dollar value of all the wealth a society has produced over a specific time period (...)" (Brandt, 1995, p.16). Moreover, the GDP of a country is said to determine the overall well being of a nations population. But as Waring (1999) argues, the GDP does not factor in environmental degradation nor does it tell us anything about poverty or poverty distribution, for instance (Waring, 1999). In this context we can see why policy makers cannot respond to issues that the capitalist economy is not designed to acknowledge (Waring, 1999).

While the above examples highlight some of the problems with economic divisions, are there some instances where the separation is justified? Some economic sociologists have argued that if referring to the economy as a self-evident object did not occur until the 20th century, then this is because the economy was still embedded in social networks until that time (Mitchell, 2006, p.1117). But as Mitchell (2006) argues, this theory is insufficient as it "evokes some essential form of the economic" (1117). In other

words, the purely economic, which can be defined as "the calculating rationality of the market" (p.1117), is still considered separate from social relations (Mitchell, 2006). Mitchell (2006) dispels this misconception of a social-economic divide by tracing the development of Edison's electrical networks in the U.S. to show how there was never a moment in which the calculations, physics and economics – i.e. socio-technical arrangements – were non-human. For instance, every component of the project: the creation the ideal household light fixtures; defining their product and service; reducing the costs of electrical materials; and the billing method, involved experimentation, innovation and choices made by Edison and his team.

Tracing the boundary construction of economic rationale and social relations is also discussed by Garcia-Parpet (1986)[1]. Garcia-Parpet's (1986) case study emphasizes the social conditions necessary for the construction of a market, by exploring the creation of a "marche au cadron," a Dutch style auction in Fontaines-en-Sologne France. Completed in the 1981, the market was conceptualized as a way to reorganize the power relations between growers (and traders) in the region by introducing a new mechanism to enhance competition. The initiative was spearheaded by powerful growers, landowners, and economic advisors: people that had formal training, experience with local politics and who were able to observe new practices in their travels to other regions. Assembling the "market" involved the installation of electronic scoreboards to present the daily prices; architecture to reduce collusion (the separation of the buyers and sellers onto different floors during the auction); and the production of detailed documents to provide buyers with information about the product, among other initiatives. These efforts were designed

[1] Garcia-Parpet"s (1986) work is also said to have served as a basis for Callon's (1998) theories of performativity (Mackenzie, 2007).

to allow for "perfect competition" to occur. Unlike the traditional trade system in the region, which involved several intermediaries such as agents and brokers, growers were now encouraged to bring their produce to this market on a daily basis where certain buyers could inspect the fruit and eventually bid on the desired lot.

As Garcia-Parpet's (1986) argues, the strawberry market could be viewed as a "kind of concrete realization of the pure model of perfect competition, a model that occupies pride of place in economic theory" (p. 20). However, the model for "perfect competition" dictates that social factors are considered residual variables that could perhaps explain anomalies in the model and impediments to achieving perfect competition. By tracing the social factors that were essential to the creation of a marketplace, Garcia-Parpet (1986) shows how the market's creation relied heavily on the initiatives of certain social actors. For instance, the market's proponents had to invest time in convincing the agricultural community of the project's viability, creating rules and regulations, as well as capital in the physical construction of the institution. Moreover, the project was spearheaded by powerful producers, landowners and skilled community members who had their own personal agendas for the market's conception (e.g. expanding markets to ensure the viability of the industry for their children who would eventually take over the business).

Garcia-Parpet's (1986) study demonstrates shows how "the market was not established in a social vacuum," (p.46) and that without these individuals and the creation of the market would not have been realized. The reason the market has been heralded as a real-life example of "perfect competition" is simply because this was the model upon which the market was constructed, in terms of design and the rules of the institution, for instance. Garcia-Parpet's (1986) case study, shows that viewing social conditions as

separate from economics is unmistakably flawed, as there are a myriad of social factors that can determine the creation, success, and failure of new markets. That said, the following section will show how viewing economic conditions as separate from social ones is not just a misunderstanding that needs to be rectified, but that these dichotomies are necessary and consciously employed to shape and maintain the notion of the economy as a as a self-evident object and thus something to be governed and to govern (Mitchell, 2010).

According to Brandt (1995), economists have in some instances acknowledged the flaws of economic calculations in that they may not account for all economic activity. Brandt (1995) mentions how often "the case of the disappearing maid"[2] is presented in the introduction of economic textbooks as a cute example of the flaws of economics; however, there is no greater discussion beyond this point. Moreover, with the growing pressure of environmental activists and other concerned citizens, organizations such as the World Bank have been forced to incorporate some environmental and social concerns into their models, but this is mostly a token effort (Henderson, 1995). As Brandt (1995) argues, the reason why women and many other areas of unpaid, economic activity remain invisible is not because of some great error nor the lack of understanding of how much these activities truly contribute to the economy. Instead, these exclusions are precisely what make capitalist accumulation so profitable (Foster, 2000). Likewise, Mitchell (2010) argues:

[2] The disappearing maid anecdote describes how if a maid were to work in a man's household her work would be paid and therefore visible. However, if she were to marry this man, but continued to do the same work, it would most likely go unpaid and become invisible. This example sometimes used in economic textbooks as an example of how economic calculations are not perfect (Brant, 1995).

> "(...) the discursive practices that appear to separate the economy from the state should be grasped not as signs making the border between two spheres but as powerful organizing practices that create the material effect of the economy as an apparently self-contained structure -- material, in the sense that the everyday force of the political order of capitalism is structured out of these discursive effects" (p.93).

Economic divisions should not be viewed as an accident, but rather contrived boundaries produced by both human and nonhuman actors, which perpetuate powerful economic objects that make alternatives impossible to imagine (Brandt, 1995; Mitchell, 2010).

What is constructing the economy?

So far I have discussed the historical context from which the economy emerged and what has been left out of this paradigm. As the previously mentioned authors have argued, the economy is not the self-evident object it appears to be (Brandt, 1995; Mitchell, 2010; Waring, 1999; Cameron, 2009). Likewise, there is no separation between economic rational and social factors (Mitchell, 2006; Garcia-Parpet, 1986). That said, our contemporary economic paradigm masks these truths. This begs the question of what and who is perpetuating these ideas and why have they remained so popular if they fail to depict an accurate picture of the economy? As Mitchell (2007), and Mackenzie, Muniesa & Sui, (2007) have argued, understanding economics as performative can help answer these questions.

According to Mackenzie (2007), "to argue that economics is performative is to argue that it does things, rather than simply describing (with greater or lesser degrees of accuracy) an external reality that is not affected by economics" (p.54). This perspective challenges the traditional view that science simply describes the world we live in, and instead reveals how it can actually produce it (Mackenzie, Muniesa & Sui, 2007). The concept of performativity has been applied to a variety of different fields, such as social sciences and humanities, although Michel Callon (1998) has been the main proponent of the theory's application to economics. In order to demonstrate the truths a performative viewpoint can make visible, in the following sections I will present Mackenzie (2007) and Mitchell's (2007) arguments concerning the performativity of economics.

First, Mackenzie (2007) examines the performativity of the academic study of finance and theories of options, which he argues coalesced in the 1950s. More specifically, Mackenzie (2007) explores the ways in which economists Black, Scholes, &

Merton created a standardized model for pricing options, which was widely adopted by economists throughout the nation. To exemplify the ways in which this project performed economies Mackenzie (2007) explores four different theories of performativity: generic performativity; effective performativity; Barnesian performativity; conditions of felicity; and counterperformativity, which I will review here. First, generic performativity can be defined as how "an aspect of economics (a theory, model, concept, procedure, data-set, etc.) is used by participants in economic processes" (Mackenzie, 2007, p.55). According to Mackenzie (2007), this type of performativity is uninteresting as it can be easily observed. Instead, Mackenzie (2007) argues that effective performativity is a much more fruitful, albeit complex, inquiry that examines situations where "the practical use of an aspect of economics has an effect on economic processes" (p.55). In other words, this type of performativity changes the way that economies are constructed. This performativity is exemplified in Mackenzie's (2007) analysis of how the Black-Scholes-Merton option model and new methods of trading (e.g. the production and distribution of sheets summarizing standardized information about option pricing for traders) did more than just create a trading tool used by economic participants (Mackenzie, 2007). This process actually changed the way in which option exchange operates, and even altered overall market prices, therefore affecting the entire economic process.

Barnesian performativity (referring to sociologist Barry Barnes) can be defined as the "practical use of an aspect of economics (that) makes economic processes more like their depiction of economics" (p.55). In Mackenzie's (2007) case study this would have required the economic model to force economic process to conform to it for it to have been considered Barnesian. In other words, this type of performativity can be understood as one that reinforces the economic process as opposed to changing it. The third kind,

conditions of felicity, involve J.L. Austin's description of performativity, who coined the term performative to describe how an utterance does something. This involves language that directly changes reality simply by being uttered during the right situation or time (e.g. saying "I apologize"). As Bourdieu (1991) has argued, linguistic performativity also depends on the body language and tone that is employed while being said (i.e. one could utter "I apologize" with a smirk on their face and their arms crossed and this would no longer do the same thing). Therefore, performativity involves more than just linguistics (as cited in Mackenzie, 2007). It also depends on considerations such as the power and status of the person who is speaking. Referring back to Mackenzie's (2007) examples, the use of Black's option price sheets and theories would not have been adopted so unanimously if it weren't for the general cognitive authority of these particular financial economics, as well as the timing of their emergence (Mackenzie, 2007). Finally, counterperformativity refers to that way in which "the practical use of an aspect of economics makes economic processes less like their depiction by economics" (Mackenzie, 1997, p.55). This is the instance in which economics not only fails to represent the economic process, but creates a rupture so great that it threatens the systems very existence. This was seen with Mackenzie's (2007) example of the stock market crash in 1987, which was caused, in part, by the Black-Scholes-Merton option model pricing patterns.

As the above literature suggests, the concept of performativity is complex, which explains, in part, the ongoing debate about the meaning and usefulness of the concept (Mackenzie, Muniesa & Sui, 2007). For this reason, Mackenzie, Muniesa & Sui (2007), have argued that the field of performativity is a concept that "is still under construction" (p.7). The authors also argue that, although at times the term may appear simplistic, "to speak at a high level of generality about the "effects" of economics on economies is a

dangerous shortcut" (p.6). The work of economics can involve a diverse and powerful range of calculations, ideas, data sets, and people (Mitchell, 2007), and the degree to which they will build on previously existing objects, are rejected, or replace old ideas, also depends on how the object of economics responds to this science (Mackenzie, Muniesa & Sui, 2007). In other words, economics is performative, but one must pay close attention to the nuances and diverse possibilities involved in how it is performed.

The exclusion and inclusion of certain things and people in market or nonmarket realms (as I have demonstrated in section 2) is not a misrepresentation, but instead a powerful tool of redistribution and control (Mitchell, 2007). Seen in this light, the narrowness of neoclassical economics makes sense; i.e. whether or not the paradigm accurately represents the economy is inconsequential, what is important is its ability to organize and control things and people. But how do people actually construct these ideas? According to Mitchell (2007), when economics assembles different technical mechanisms (e.g. new property titling programs), these representations and material artifacts can move people and objects across a border of market or nonmarket activities, making them visible or invisible. These practices help construct and perpetuate a powerful illusion that a border exists between capitalist/non-capitalist or market/non-market activities, borders which are necessary to implement the work of economics.

Mitchell (2007) exemplifies these arguments by exploring a property titling program created by the ILD (Institute for Liberty and Democracy) in South America. In *The Mystery of Capital*, the ILD's Hernando De Soto argues that the reason why non-Western nations remain in poverty is primarily due to the fact that landowners have no official title for their property and as a result lack access to capital (that most Western nations property owners apparently have) that would enable them to start their own

businesses etc. But as Mitchell (2007) argues, there is no historical or contemporary evidence that proves Desoto's land titling projects have indeed increased the capital of those who have acquired such titles. On the contrary, Mitchell (2007) shows how the consequences of this program have mostly made the lives of these "property owners" more precarious as the introduction of these land titling programs to "non-market" realms has resulted in dispossession, increased speculation, and ultimately the transfer of both material and capital wealth to the elite and wealthy.

Nonetheless, these programs were widely adopted by many governments and at times even bypassed political systems and programs to become first in line (Mitchell, 2007). But how did this happen if de Soto provides us with no contemporary or historical evidence of the success of the program? According to Mitchell (2007), the persuasiveness has to do with the fact that the project was marketed as inexpensive. Moreover, the fact that this project could appear cheap had to do with the artificial construction of a border between market/non-market realms (Mitchell, 2007). First, de Soto describes how the nonmarket realm as impoverished and suffering because it's a realm outside of the capitalist market. By situating untitled land in the precarious state of "outside" the market, the simple requirement for this project was to bring this "dead capital" into the "active marketplace." As Mitchell (2007) argues, this powerful action of constructing and sustaining the border between market and nonmarket practices is one of the ways in which economics performs the economy. Without these socio-technical constructions the economy would not exist. So rather than the self-evident object that it appears to be, the economy can be understood as simply overlapping and sometimes rival attempts to establish such socio-technical projects (Mitchell, 2006). As Mitchell (2007) summarizes:

"to argue that the power of economics is performative is not to argue that its power necessarily lies in getting people to adopt its representations; rather in helping to constitute the apparent border between the market and the non market, economics contributes to the work of sociotechnical mechanisms that reorganize how people live, the political claims they can make, and the assets they can control. It's particular role, I argue, is in formatting a form of exclusion and inclusion" (Mitchell, 2007, p.248).

Although the above processes and power relations are complex, by making socio-technical projects visible, performativity can effectively "open them up to explication and in turn alternative possibilities" (Mitchell, 2007, p.247). According to Mitchell (2008), the work of economics can be traced by understanding the specific history of a movement; its methods of organization; its political projects; the sites of economic knowledge it brings into being; and the kinds of representation it makes possible (p.1121). The latter method will be therefore employed to frame the analysis of Ecotech Quebec.

A more inclusive economy?

So what are the solutions to these issues? Should the household and the environment be made a visible part of the economy? Should walking to work somehow be factored into the GDP? Political economists, feminists, economic geographers and others have long sought answers to these questions (Brandt, 1995; Cameron & Gibson-Graham, 2003; Henderson, 1991; Lourdes, 2003; Waring, 1988). In the following section I will present some of the literature, which has made significant contributions to the imagination of an alternative economics.

As Waring (1988) argues, in order to create a more equitable and accurate representation of the economy, this would require the development of indicators, which would assign monetary value to women's household labor, for instance. Ideally, these indicators should be incorporated into the calculation of GDP such that measurements could then better represent the well-being of society. According to Waring (1988), such a project is beneficial not only to those who have been traditionally excluded from the economy, but to the economy itself. For instance, by developing a more accurate picture of how all members of society truly spend their time, this can allow policy makers to develop more effective policies, which can pinpoint impediments to productivity.

Similarly, Lourdes (2003) discusses the problems associated with the concept of development, which is interwoven with the modern understanding of the economy. According to Lourdes (2003), development defined narrowly in terms of economic variables, has little room for gender equality, for instance; a topic she argues should be of great concern to economists. Lourdes (2003) refers to an example of the correlation between the availability of social services and women in the labour market in Northern and Southern Europe. In places where social services are greater, more women are able to

participate in the labor force and as a result had more children. Where these services were not available the opposite occurred. According to Lourdes (2003) "no one would deny the major significant of demographic change for development and policy making, including its impact on the gender division of labour, household composition, gender relations, and the changing structure of the labour force" (…) but many economists seem to remain insensitive to this issue" (p.10).

As a possible solution to this exclusion, Lourdes (2003) discusses the creation of the UNDP's Human Development Index, which involves the creation of "indicators less dependent on exclusively economic variables and more appropriate for evaluating human development" (p.18). Such indicators include, literacy, life expectancy, and enrollment in all levels of education, for instance. However, the exclusion of other important elements of human development point to the limitations of these metrics (Lourdes, 2003). As Lourdes (2003) argues, "indices cannot, for example, capture a dynamic sense of empowerment at the level of individuals, households, and communities" (p.20). Nonetheless, this system, although imperfect, is still one step closer to a constructing a more diverse understanding of development.

Finally, Brandt's (1995) critique of the economy goes beyond the literature that simply "counts in" or "adds on" to the economy. As this she argues, regardless of the accuracy or truth of what the modern understanding of the economy entails, the widespread belief in "modern capitalism and the market approach to economic progress" prevails (p.2). However, the Western nations who promulgate such models are simultaneously plagued by all kinds of maladies, which indicate mass "expressions of social and cultural breakdown" (Brandt, 1995, p.2). With these ideas in mind, Brandt (1995) calls for a new economics, which redefines notions of success to better cater to the

real-life well-being of greater society, instead of the needs of only very small part of the population.

Likewise, Cameron and Gibson-Graham (2003) view the "counting in" or "adding on" of the traditionally excluded economic spheres as dubious, because these approaches are still attached to the narrow dichotomies of popular economic discourse (capitalist vs. non-capitalist), and as a result maintain a vision of the economy as a self-evident, enumerable sphere. In other words, these arguments in a sense reinforce the very system they work against. Moreover, Cameron and Gibson-Graham, (2003) argue that any alternative discourse of economic activities (i.e. non-hegemonic interpretations of what is economic) runs the risk of "capitalocentrism", which these authors define as "the hegemonic representation of all economic activities in terms of their relationship to capitalism – as the same as, the opposite of, a complement to, or contained within capitalism" (p.3). If we use the previously mentioned example of Waring (1999), who calls for the adding in of new spheres of reproduction, this argument would mean that the household for instance, could only be defined in relation to a system that privileges profit above all else (Cameron & Gibson-Graham, 2003). Therefore, Cameron and Gibson-Graham, (2003) argue that in order to create a more equitable and just economy, we would need to move beyond the traditional capitalist and economic frameworks by performing alternative or non-capitalist economies. These authors attempt to carve out a new space free from any previously defined paradigms envisioning "the economy as an open-ended discursive construct made up of multiple constituents" (Cameron & Gibson-Graham, 2003, p.17). With this idea in mind, Cameron and Gibson-Graham (2003) advocate for an "economy in which the interdependence of all who produce, appropriate, distribute, and consume in society is acknowledged and built upon" (p.19).

In the following section I will explore the emergence of a potential "alternative" economy — the "green economy". I will shed light on the contradictions it embodies as well as the progressive potential it holds, in order to provide a greater context in which to explore the creation of Ecotech Quebec.

The rise of the "green economy"

" [the green economy] embodies the promise of a new development paradigm, whose application has the potential to ensure the preservation of the earth's ecosystem along new economic growth pathways while contributing at the same time to poverty reduction" (UN DESA, 2011).

The global financial crisis of 2008 and the growing popularity of the environmental movement explains, in part, the rise of the green economy (Davies and Mullen, 2010). With supra-national organizations such as the UNEP, the EU Commission, and the OECD promulgating this ideology there has been an ongoing debate as to how greening the economy should occur (Brand, 2012). Where environmentalists and activists typically promulgate slowing down economic growth and more radical change, the business community and government herald technological fixes (e.g. cleantech), which promise environmental solutions while maintaining economic growth (Davies & Mullen, 2010). According to Davies and Mullen (2010), in the US, UK, and Ireland the latter situation typically involves "encouraging technological eco-innovation and enterprise within the private sector; that is effectively greening the outputs of the mainstream economy rather than anything more radical" (p.2). This trend raises doubts about the ability of the green economy (as articulated by supranational organizations, government, and industry) to ameliorate social and environmental dilemmas we face.

Similarly, Brand (2012) highlights the oxymoronic nature of the green economy concept by shedding light on its business-as-usual discourse and inherent contradictions. First, Brand (2012) points out the similarities between sustainable development (Rio 1992) and green economic discourse (2012), arguing that the latter has replaced the former now defunct paradigm (as these policies have failed and resource use has increased in the last 20 years) due in part to its "no compromise" technological discourse. This discourse is

promulgated by the European Commission, UNEP, and the OECD in green economy strategies that claim to simultaneously reduce ecological problems and solve the current economic crisis (e.g. via the reduction of resource consumption, the improvement of energy efficiency, innovation, and clean technologies). The types of green economic policies that are typically employed involve the implementation of new (albeit weak) government regulation; the valuation of environmental costs (counting in); tax and policy reforms; a low carbon economy; enhancing R&D for clean technologies; poverty eradication; the greening of businesses; and the promotion of energy efficient infrastructure. These strategies all point to the necessity of economic growth alongside environmental remediation and an unwavering faith in already existing forms of governance and economics (Brand, 2012).

Second, Brand (2012) reveals how the green economy paradigm fails to acknowledge gender perspectives, military conflict related to resource competition, and the proliferation of liberal globalization. In addition to these exclusions, Brand (2012) outlines other structural reasons why the promises of the green economy cannot be realized: political strategies involving global competitiveness, geopolitical interests, and free trade; the capitalist market and profit-driven development technologies; societal orientations relating to growth at any cost; power relations under the dominance of global elite. According to Brand (2012), these factors give rise to a "selective greening of the economy", one that will ultimately fail to eliminate poverty and ecological degradation (Brand, 2012). In order to avoid this fate, new understandings of wealth, production, and consumption must be developed. Likewise, to realize a more transformative orientation, the green economy debate needs to be linked to questions of democracy regarding who makes choices about the dominant forms of production and consumption in addition to

participation. As Brand (2012) highlights, in analyzing the green economy the following questions should be asked:

- What are the dynamics behind a selective greening of the economy?
- Whose interests are at stake?
- Whose interests are excluded or even repressed?
- Which forms of exclusion will be linked to a green economy?
- Under what conditions does a greening of economy take place?
- Which understanding of the economy and well-being is promoted?

McCarthy and Prudham (2004) elaborate the historical and interconnected "parallels and tensions" between the advance of the neoliberal juggernaut and the environmental movement; connections they consider "underexplored in critical scholarship" (p.275). In doing so, these authors discuss how liberal ideology first rearranged social relations to nature by rendering the commons obsolete in order to exploit food production for capitalist gains (McCarthy and Prudham, 2004). John Locke is said to have played a pivotal role in this transformation by legitimizing private property regimes by arguing that nature could only be understood as valuable when "laboured." These social relations to nature still resonate with today's technological fixes for "saving nature" (e.g. genetic engineering and bioprospecting) as they claim to similarly improve "unproductive" nature by bringing it into the market. According to McCarthy and Prudham (2004), liberal theory resulted in violent relationships (e.g. land dispossession) and contemporary class structures (e.g. private property) and is in many ways embedded in today's vision of the green economy.

Whereas the above arguments demonstrate the ways in which liberalism has altered social relations to nature, McCarthy and Prudham (2004) show how "the neoliberal project is not hegemonic: it has been roundly criticized and attacked, and it has faltered in a number of respects" (p.275) with the environmental movement as neoliberalism's main contender. The thwart of the environmental movement is made obvious by the energy spent by neo-liberals to dismantle environmental regulation (most of which was assembled under the Keynesian state). Polanyi's dual movement thesis can be used to explain the relationship between these two paradigms (McCarthy and Prudham, 2004). For instance, while neoliberalism's hegemony has spurred environmentalism, neoliberalism has counter-attacked this movement by coopting its symbols and discourse as a mechanisms to deflect criticism and to mask business-as-usual activities. This non-linear relationship has also resulted in the environmental movement adopting certain neoliberal rhetoric in their approach to governance as well. This fluctuating relationship between the environmental movement and neoliberalism explains, in part, the multiple interpretations of green economies we see today.

Also documenting the connections between the ecological crisis and the crisis of neoliberalism, Jessop (2012) describes the complex ways in which economic and ecological imaginaries interact, compete, and mutate. As Jessop (2012) argues, an imaginary can be understood as "a simplified, necessarily selective 'mental map' of a super complex reality and typically has normative and cognitive functions. These maps are never purely representational accounts of external reality: many actually help to construct the reality that they purport to map" (p.17). Moreover, an imaginary produces complex "sums of activities" in a given field (e.g. the economy) and can be challenged and/or restructured by counter-imaginary and/or periods of crisis, therefore imaginaries are never

truly fixed. As Jessop (2012) argues, "crises tend to create profound cognitive, strategic, and practical disorientation by disrupting actor's sedimented views of the world, including their various social imaginaries" (p.18). The global financial meltdown is considered one such crisis, however since this crisis is articulated within a dominant economic imaginary it is understood as a "crisis of finance-dominated accumulation and/or as a crisis in neo-liberal economic models" (p.20). As a result the immediate and long-term solutions are also limited to this narrow understanding.

The rise of the New Green Deal (i.e. the green economy) as a "longer-term exit strategy" for the financial crisis signifies the emergence of a new economic imaginary (Jessop, 2012). That being said, the ability of the NGD to hold its own against competing imaginaries to "be translated into accumulation strategies, state projects, and hegemonic visions" (Jessop, 2012, p. 21) is uncertain. According to Jessop (2012), "given the current conjuncture and *rassemblement* of capitalocentric forces, it is likely to gain a strong neo-liberal inflections in the leading national economies whatever its form beyond them and/or at the local level" (p. 21) suggesting its popularity may expire. The "zombie neo-liberal colonization" of the NGD, which seeks to renew capital accumulation via the commodification of nature (e.g. pricing & trading) threatens to drain progressive undertones of the movement, thereby representing considerable challenges. In order to achieve real change Jessop (2012) calls for an alternative imaginary that transcends capitalocentric logic by focusing on quality vs. quantity in relation to growth, equitable relations (e.g. where the greening of the West does not exploit the global south), as well as innovative collaborations and experimentation. Again, what is emphasized in this perspective is a more transformative view of the green economy, where considerations are balanced rather than economic considerations being privileged.

Here it is important to note that some scholars have called for a need to clearly define neoliberalism in concrete rather than abstract ways to better establish what effects that it may have on nature/ecological concerns. Expanding our definition of "nature" (e.g. to consider the interrelationships between ecological processes, human and nonhuman actors) would also provide a more comprehensive analysis of these interactions (Bakker, 2010). More specifically, Bakker (2010) proposes a typology of a range of contemporary policy approaches to the governance, regulation, and enumeration of nature. For instance, specific tactics of neoliberalism such as marketization are linked to primary commodities, affective bodies, and ecosystem services, to allow for a more precise framework to analyze the way in which neoliberalizations and socio-natural entities interact. Moreover, Bakker (2010) argues that the effects of neoliberal natures may not always be negative for all actors. She also emphasizes how it is important to consider specific contexts to establish whether new policies (e.g. green economy) will have negative effects that are commonly associated with neoliberal orientations today.

Following from this, Shear's (2010) analysis offers a case in point. Shear (2010) also examines the rise of the green economy by focusing more specifically on the American context. In discussing the Obama administration's efforts to promote clean energy and green jobs, Shear (2010), like Brand (2012), highlights how the U.S. green economy is articulated as a dual solution to both climate change and the economy, or what has been called a new "Green Deal". At the same time, Shear (2010) argues that the current economic and environmental crisis has caused "massive dislocations and insecurities and exacerbating inequalities" (p.204), which have opened up a discursive space in which alternative economic practices, unlikely alliances, new desires and belief systems can emerge. Shear's (2010) argument echoes that of Mitchell's (2010) who

similarly describes the way in which the Great Depression created the global economic crisis which allowed for the discursive construction of our modern understanding of "the economy" (see earlier section of literature review). In other words, both authors argue that periods of crisis enable new possibilities and discursive formations, or as articulated by Gramsci "every crisis is also a moment of reconstruction; there is no destruction, which is not, also, reconstruction" (Hall, 1988, as cited in Shear, 2010). While acknowledging the way in which the green economy may involve "very real possibilities of cooptation and complicity" (p.205), Shear (2010) focuses on the transformative possibilities of this movement, which I will discuss bellow.

Shear's (2010) findings demonstrate how in his hometown of Massachusetts, the green economy movement embodies a "variant of antagonisms" (e.g. families, environmentalists, people of color, workers, immigrants) that together are discursively constructing their own vision of a green economy. In this context, Shear (2010) argues that these green economy coalitions, operating from a new place-based "revolutionary imaginary" are,

> "working to transform the economies of their communities by impacting local, state, and national policy, through oppositional political tactics as well as through formal political channels, by monitoring the actions of capital and by creating their own economic relationships, and by "greening the world" through focusing on transforming their communities in ways most appropriate to their own particular resources and conditions" (207).

Drawing on Cameron and Gibson-Graham's (2003) arguments (some of which were discussed above), Shear (2010) highlights how a part of what makes these coalitions powerful is the "freedom to imagine" what the green economy will entail, a "powerful sense of agency" that permits citizens and organizations to rethink the capitalist economy, new class processes, and social relations. These green economy "imaginings" thus

embody the potential to bring a diverse range of people together to engage in non-capitalist "progressive, radical, or emancipatory practices" (Shear, p. 209, 2012). However, this much welcomed alternative, must still compete against dominant green economy understandings, which remain very much fixed on resuscitating capitalism as opposed to dismantling it.

In the same vein, Danaher, Biggs, and Mark (2007) highlight the transformative potential of the green economy. Without any specific definition of what the green economy entails, these authors explain how initiatives must be democratic (local decision making); polyvocal; serve a wide range of needs; empower citizens; improve environmental health; enhance social inclusion; involve bottom up and top-down approaches; capitalist operations; and re-think individualistic cultural values. Examples of grassroots projects that are said to embody these initiatives involve class action lawsuits against massive corporations in relation to environmental racism, the development of organic food markets, and participatory budgeting in different cities throughout South America. In a sense, the "green economy" stories these authors tell could also just as easily be understood as traditional environmental or social justice efforts, as they are not radically different, however, according to Danaher et.al, (2007), this is a result of the green economy being an "organic evolving being".

Unlike Shear (2010), however, Danaher et. al, (2007) do not emphasize the emancipatory potential of a total re-imagining of the current economic system — evident in their articulation of this initiative as a "rapidly growing sector of the economy" (p.5). While they do recognize the limitations to the notion that change can be bought (e.g. via mass purchases of organic produce by large corporations), they see a place for both "corporate green" and grassroots initiatives, as this accommodates a wide range of

interests, while still "pushing farther and redefining mainstream, and normal, and acceptable" (p.11).

This literature explores the multiple and competing visions of the green economy and what is at stake in the development of this paradigm. As many of the authors have argued, the green economy is a discursive construction which serves as a timely remedy for the environmental and fiscal crisis we face (Brand, 2012; Jessop, 2012; Shear, 2010). Whereas some foreground the potential for progress and transformation (Shear, 2010) with the rise of a green economy movement others are less optimistic about the possibilities that the green economy can create (Jessop, 2012).

This empirical analysis of the construction and stabilization of Quebec's green economy can thus provide some important contributions to the contemporary debate concerning how the green economy is being enacted and the potential for, and limits of, this new economic object.

Discussion

The performative actions of the government and economic experts explain, in part, why the economy appears as a self-evident object (Mitchell, 2007). But this representation of the economy is extremely narrow and many things and people get left (Cameron & Gibson-Graham, 2003; Lourdes, 2003; Mitchell, 2010). As we have seen women and/or household work are excluded realms, and as a consequence, made precarious (Cameron & Gibson-Graham, 2003; Brandt, 1995). Similarly, the environment is also left out of the economy, as it is viewed as an externality in relation to development projects (Brandt, 1995). Ignoring ecological considerations in this way has resulted in devastating environmental issues; however, recently there has been a reemergence of environmental activism and progressive change initiated by governments, environmentalists, and citizens alike. The "green economy" has emerged, in part, as a result of this evolution, and had entered into mainstream political-economic discourse, most notably since the latest Rio-summit in Brazil where it was a key topic of discussion. The United Nations Environmental Program (UNEP) has since compiled and disseminated a major document describing environmental problems, the potential benefits of green economic development, as well directions directions for policy makers (see Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication, UNEP, 2012).

Following this trend, the Quebec government has been working to promote their own green economy since 2008. The major outcome of this initiative has been the creation of Eco-tech Quebec, a group that is also referred to as Quebec's "cleantech cluster". Located in the World Trade Center of downtown Montreal, this organization seeks to accelerate the transition to a green economy through the sustainable development of clean technologies in Quebec. This research will provide a theoretically informed analysis of the

way in which economic theory, experts and governing authorities perform the emerging green economy in Quebec, and the inclusions and exclusions that are instituted in the process. The following chapter will present the methodology employed to construct this analysis, and this is followed by a presentation of the data and themes that emerged from this research in Chapters 4 and 5.

Chapter 2: Methodology

This research explores the emergence of Quebec's green economy by examining the construction of the provinces clean technology cluster, Ecotech Quebec. More specifically, my research objectives are to: (1) trace the political and economic relationships performing Quebec's cleantech cluster; (2) expose the socio-technical (human/nonhuman) mechanisms and boundaries which compromise this project; (3) shed light on the exclusionary and powerful nature of this representation; (4) link these processes to the broader debate of neoliberal economics and greening capitalism; and (5) to contribute new empirical data to the already existing literature. My research questions are as follows:

(1) What is Quebec's green economy? What are the organizations, data sets, actors, and activities that constitute this new object?

(2) What is the process by which the green economy is being constructed?

Methodology

Actor-Network Theory (ANT) will be employed as guide for this research. First popularized by Latour, Law, and Callon, ANT is an approach regarding "how to study things (...) or, rather, how to let the actors have some room to express themselves" (Latour, 2004, p.63). The goal of ANT is to therefore avoid the limitations of predetermined frameworks and instead "follow the actors" by tracing their complex relationships in an attempt to open the "black box" of science and technology (i.e. exploring why we have the socio-technical arrangements that we do) (Latour, 2004). The process of group formation is thus seen through the eyes of actors and can be translated by the social scientist through descriptive analysis of what they do. Moreover, actors should

be understood as a heterogeneous group of humans and nonhumans (e.g. governments, technologies, and money) that have equal agency in constructing a network (Cressman, 2009). As Mitchell (2007) argues, the people and things that construct sociotechnical objects operate in collaboration with "sets of information, arrangements, and agencies, with different strengths and resources (...) (and) take a variety of forms and acquire different degrees of force and effectiveness" (p.245). Likewise, drawing on economic performativity literature Lansing (2011) highlights the interdependent relationships between material artifacts, processes and representations in stabilizing an object. As he shows, these relationships are particularly important to consider in relation to ambiguous and unstable elements such as carbon offsetting projects.

Latour (2005) highlights four different ways to trace a group formation. First, focusing on the actions of the *spokespersons* is essential, as these "group makers" work continuously to prop up their group's existence via definitions, mandates, and justifications, actions that simultaneously suppress the other "contradictory voices" (p.31) that may compete with their project. Second, reinforcing and stabilizing the boundaries of a group requires the designation of *anti-groups*. These anti-groups are identified, rendered defunct, or irrelevant via comparisons and other arrangements that act to exclude them. Third, group formation requires *defining* which renders the project "a finite and sure thing, so finite and sure that, in the end, it looks like the unproblematic definition" (Latour, 2005, p.33). These definitions are constructed by the spokespersons of the group and serve to reinforce its boundaries to ultimately render the object they produce unquestionable. Finally, the role of the social scientist must also be considered in group making. As Latour (2005) highlights, "any study of any group by any social scientist is part and parcel of what makes the group exist, last, decay, or disappear" (p.33). In the same way Ecotech

constructs facts that define their project, exclude others, and make their project known, and draws upon a concept popularized by an international renowned social scientist, i.e. the cluster concept, as a framing device to fix this particular economy.

Since I am focusing on the performative construction of a new economic object inspired by the work of Timothy Mitchell (who also draws on ANT to explore the construction of economic projects, i.e. their actors, representations, and exclusions), this approach is well suited for examining this case study. The literature presented in the previous section was also employed to examine this case study, but also to link these relationships to broader economic processes and politics.

Two methodologies were employed to construct this analysis. First, I conducted 25 in depth semi-structured interviews with key "spokespersons" from Eco-tech Quebec, the federal and municipal government, economists, as well as industry members. Semi-structured interviews are defined as "a context in which the interviewer has a series of questions in the general form of an interview guide, but is able to vary the sequence of questions" (Bryman and Teevvan, 2005, p.386). This approach therefore provided the necessary time and space for interviewees to discuss their perceptions of the themes I wished to explore, as they each lasted for approximately one hour. For each interview I prepared an interview guide (a list of questions based on the key themes from the literature). These themes included, but were not limited to, the creation of Eco-tech (how it was initiated and by whom); its main objectives; the methods and tools used to develop the sector; the key actors involved; as well as the challenges and opportunities the organization may face. I continued to adapt the interview guide as I began to identify emergent themes and ideas from the initial set of interviews conducted.

In order to find participants for my study I began by sending e-mails and

telephoning key informants. These individuals were identified by examining newspapers, websites, and other data, that discusses Quebec's green economy and Eco-tech Quebec. When I contacted each individual I provided the appropriate information about my project, answered any questions that they had, and provided them with a consent form concerning their participation (i.e. confidential or non-confidential). After each interview I probed participants for recommendations for other potential interviewees to gain more direct contacts (e.g. personal e-mails/phone numbers); a method referred to as snowball sampling (Bryman and Teevvan, 2005). Once my interviews were complete, I transcribed and translated (when necessary) them and then examined the transcribed interviews to identify prevalent and recurring themes.

Second, this empirical data was also complemented by a textual analysis of newspapers articles available online and in print form, policy documents (e.g. annual reports and strategic plans), websites, and other marketing material produced by Eco-tech and the Quebec government, guided by the aforementioned themes. The data that emerged from these methods was then cross-checked to identify similar as well as diverging themes in order to begin to trace the history and nature of this project, and the key actants and events that have been shaping it.

Chapter 3: Cluster policy in Quebec

In this section I will present a brief overview of the major political initiatives that are currently shaping green economic development in Canada. Since the policy paradigms and strategies in the U.S. have strongly influenced those in Canada, an overview of these policies is also included. This analysis will provide a greater context to the development of Quebec's green economy, while also making links to some of the theory highlighted in Chapter 2. This section will be followed by a review of cluster policy in Quebec as these strategies have greatly influenced the creation of Ecotech Quebec.

U.S.

Despite opposition from industry and conservatives as well as other attempts to downplay this crisis, climate change is widely recognized as a legitimate cause for concern and one of the key drivers of green economic development. Norway, China, and Germany are said to be among the major leaders in GND initiatives (Jessop, 2012; May, 2013). For instance, green jobs in Germany are said to have risen from 160, 000 in 2004 to 300, 000 jobs in 2009 (Folbre, 2011), while Norway ranked 3rd for their domestic policy on renewable energy use and GHG emissions (UNEP, 2011). The UK, Japan, and Sweden have also gained first place in world rankings for GHG reductions by means of innovative environmental policy such as carbon taxing (Sweden), climate change levies to encourage energy efficiency (UK), and transportation reforms (Japan) (The Conference Board of Canada, 2013). While these nations are playing a lead role in spearheading green initiatives, the US and Canada's progress has been more tumultuous.

Since Obama's 2009 election his administration has rallied for green jobs, renewable energy, and other programs to ameliorate both environmental problems and

stimulate economic development. Van Jones, Obama's former special advisor for Green Jobs, was at the forefront of this movement advocating that "market-led green-growth can remediate the dual crisis (economy & environment) of our time" (p.204), a theory that was summarized in his book *The Green Collar Economy: How One Solution Can Fix Two of our Biggest Problems* (Shear, 2010). Obama's initiatives have lead to increased fuel efficiency standards for vehicles, the development of smart-grid technologies, and major investments in clean energy however, in recent years the green economy has been overshadowed by the economic crisis (Pernick, 2011).

In 2010 Obama was forced to shelve a proposal to cap-and-trade carbon emissions of major polluters due to political opposition and polls suggesting drops in ratings by 2010 (Siddique, 2010). As well, several cleantech firms that obtained large subsidies as a part of Obama's Recovery and Reinvestment Act have gone bust; failures which were made front and center by Republicans during the 2012 election campaign (Investors.com, 2012). The hope that clean-technologies would revive the U.S. manufacturing industry via start-up subsidies has also been disappointing, since while assembling is performed in the U.S. the majority of manufacturing still remains overseas (Uchitelle, 2010). Despite the ongoing criticism of Obama's clean-tech stimulus, recent publications claim the U.S. is now home to 3.1. million green jobs[3] (located primarily in California and New York), which suggests Obama's green economy has been successful on some levels (Pollack, 2012).

[3] According to the U.S. Bureau of Labour Statistics green jobs can be defined as (1) "jobs in businesses that produce goods or provide services that benefit the environment or conserve natural resources [and] (2) "jobs in which workers' duties involve making their establishment's production processes more environmentally friendly or use fewer natural resources" (Bureau of Labour Statistics, 2012). This broad definition has also attracted controversy (Broder, 2012).

During the 2012 election campaign both Obama and Romney remained coy about their views on climate change (Hernandez, 2012) which is no surprise since the mere mention of climate change during the first four years of Obama's term was considered taboo in light of the economic recession (Goldenberg, 2013). But in the aftermath of the hurricane Sandy catastrophe, which ravaged the East coast last fall, New York Mayor Bloomberg chose to endorse the Obama campaign arguing that Obama proved the best candidate to deal with climate change (which he claimed may have caused the hurricane), thereby casting the controversial topic into the forefront of the political debate (Hernandez, 2012). During Obama's acceptance speech the president finally opened up to mention the importance of tackling the climate change issue (Carrington, 2012). Since then, Obama has shifted towards an emphasis on climate change mitigation instead of green jobs, in part because of the failures associated with the latter initiatives, but also because of the growing evidence that climate change is a real and pressing (therefore more politically viable) issue in the U.S. (Leonhardt, 2013). More recently Obama has announced his ambitious Climate Action Plan, which will introduce rules and regulations aimed at curtailing greenhouse emissions in order to meet moral obligations towards future generations, but at this point no concrete actions revolving around this plan have been made (Revkin, 2013).

Canada

While the U.S., China, and Germany are said to be leaders in developing their green economy, Canada has fallen behind these countries resulting in a total of 66, 000 green jobs and an investment gap in clean technologies of 11.5 billion compared to the U.S. (Blue Green Canada, 2013). According to the National Round Table on the Environment and the Economy (NRT), the Canadian government has not taken strong enough measures to develop its green economy and as a result risks losing its competitive edge as well as massive financial losses related to environmental degradation (Scoffield, 2012). Many relate Canada's reluctance to invest in cleantech to the country's unfailing commitment to developing fossil fuels and oil sands regardless of the environmental repercussions of such activities (May, 2013). That said, the government has recently announced an investment of $325 million over eight years in clean technologies (SDTC, 2013). Other green investments to expand green infrastructure (e.g. wastewater, carbon storage, and solid waste) as well as energy efficiency and transportation fuels (e.g. green buildings, retrofit projects, vehicle upgrades, and biofuels) have also been made (Natural Resources Canada, 2011). The latter initiative involves the allocation of 1.5 billion (2008-2017) in biofuel development as well as 3 million to promote the use of alternative energy in transportation, therefore some progress has nonetheless been made (Natural Resources Canada, 2011).

At the provincial level however, green economy initiatives are more widespread. For instance, the province of Ontario is said to have one of the strongest renewable energy programs (The Green Energy and Economy Act) that has successfully attracted over 30 renewable energy manufactures to the province (Blue Green Canada, 2013). Nova Scotia has also been praised for its community feed-in-tariff program designed to promote solar

and wind energy development, which is revitalising the local economy (Blue Green Canada, 2013). The city of Vancouver is also said to be a leader in green economy initiatives. With the goal to double the number of green jobs from 2010-2020 (the city has currently identified approximately 15,000 jobs), the city is developing and promoting five green job clusters, creating a "green enterprise zone", and engaging local businesses to green their operations (City of Vancouver, 2013). At the provincial level the B.C. government has developed an expansive green economy plan involving the development of provincial cleantech clusters [4] (which are said to facilitate collaboration between research and industry), renewable energies, green buildings, and clean transportation, among other programs which are transforming B.C.'s economy (B.C. Ministry of Environment, 2012). As we will see the Quebec government has also made commitments to green their economy which have given rise to their own provincial cleantech cluster, Ecotech Quebec. The focus of this case study is to trace the development of this initiative and by doing so provide some much needed insight into the nature and implications of these popular green economy projects and the claims they make regarding their ability to transform the economy.

[4] The promotion of clean technologies is a key initiative in the Provinces promotion of the green economy. According to the B.C. government "Cleantech is everywhere in the green economy. BC is a global leader in clean tech innovations, and its integration across all of our sectors has made our green economy a reality. By providing sustainable solutions to old problems, and creating new technologies for new industries, clean tech is revolutionizing our economy. But clean tech isn't just enabling our green economy – it's an export for BC too. Clean tech has never been in more demand on a global scale, and that's an opportunity BC must capitalize on" (B.C. Ministry of Environment, 2012).

The creation of Eco-tech Quebec

Before describing the evolution of the cleantech cluster, it is important to consider some of the major developments that have influenced green economic policy and cluster strategy in Quebec and Montreal, as these processes have shaped the context in which Écotech was assembled. This remainder of this chapter is organized as follows. First, I begin with a discussion of Quebec's recent provincial sustainable development and green economy initiatives, by outlining the various actors, ideas, and institutions involved in these developments. In the second part of this chapter, I discuss the evolution of cluster policy in Montreal, a history that I trace by drawing on findings from the interviews as well as other empirical data.

Provincial initiatives

The province of Quebec began exploring its potential for sustainable development in 1992 at the United Nations Conference on Environment and Development (1992 Rio Summit). The analyses produced during this period along with other initiatives eventually accumulated in the creation of the Sustainable Development Act in 2006, which was designed to legally enforce sustainable initiatives in all government ministries and bodies (Government of Quebec, 2012). This also led to the new position of Sustainable Development Commissioner, who reports annually to the Auditor General of Quebec and National Assembly on the progress of this new legislation. The Sustainable Development Act was followed by the creation of the Sustainable Development Strategy (2008-2013)[5].

[5] This strategy was inspired by the 27 principles of the 1992 Rio Declaration on Environment and Development and the 2002 Johannesburg World Summit of Sustainable Development Plan of implementation. It was also influence by Montreal's Sustainable Development plans created by St. Laurent Mayor, Alan Desousa, whose participation in the creation of Ecotech is discussed in Chapter 5.

This strategy serves as the implementation framework for sustainable development in Quebec, by outlining the responsibilities of government agencies; key objectives; monitoring measures; strategic directions and other areas of intervention. This document was subject to a public consultation process in which 185 citizens commented on the draft via an online forum, in addition to 31 organizations who presented their concerns to a parliamentary committee (Government of Quebec, 2012b).

The Sustainable Development Strategy (2008-2013) defines sustainable development and describes the vision for its implementation as follows:

- Sustainable development: development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Sustainable development is based on a long-term approach which takes into account the inextricable nature of the environmental, social and economic dimensions of development.

- Vision: A society in which the citizen's quality life is and remains a reality. A responsible, innovative society able to excel in all of its achievements. A society based on harmony between economic vitality, environmental quality, and social equity. A society inspired by a State whose spirited and enlivened leadership leads it to reach this vision.

- Priority actions: The three key priority actions to realise this vision are to (1) inform, raise awareness, educate and innovation; (2) to produce and consume responsibly; and to (3) practice integrated, sustainable land use and development (Government of Quebec, 2012).

The latter actions are achieved through the creation of 9 different round table groups; the dissemination of information and or/education programs to sensitize government agencies and the private sector; a sustainable development coordination office (the BCDD); and other collaborations with external partners (Government of Quebec, 2012).

Une économie vert et prospere

As a result and extension of Quebec's Sustainable Development initiatives, the Government of Quebec began strategizing to promote its green economy in preparation for the Rio + 20 United Nations conference in 2012. Largely influenced by Quebec's 16 Principles of Sustainable Development (as earlier mentioned) and other UNEP (United Nations Environmental Policy)[6] inspired best practices, the Quebec government defines the green economy as follows: "An economy that contributes to sustainable development by improving human wellbeing and social equity, while significantly reducing environmental risks and the depletion of resources'' (Government of Quebec, 2012). In acknowledging how our current economic model has caused both social and environmental devastation, the green economy is viewed as an opportunity to,

> "support the development of certain strategic sectors of the economy and to create jobs, but especially as an opportunity to better align the economy along the environmental and social principles of sustainable development (...) The green economy focuses on innovation, technical development, green goods and services and, more precisely on the growth of sectors of the economy such as renewable energy. The transition towards this model can be seen as a way of stimulating economic activity and job creation by developing new products and processes and reaching new markets (Government of Quebec, 2012).

A modern economy, a skilled labour force, innovative processes and tools, along with the sustainable development institutional framework are some of the many assets that are said to help Quebec's transition to a green economy (Government of Quebec, 2012). Today, Quebec's environment and green technology industries are said to have created 34, 000 jobs with revenues up to 3.5 billion dollars (Government of Quebec, 2012). Yet, one can

[6] This definition was derived from the "Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication - A Synthesis for Policy Makers" produced by the United Nations Environmental Program, 2011. The Quebec government has adopted this exact definition of a green economy (see above) from this document.

already see how two often contradictory goals — social equity and economic growth — are deemed central to the government's vision.

The following list summarizes the principal initiatives associated with the development of Quebec's green economy:

- Fighting climate change and adapting to it; reducing air pollution
- Energy efficiency and renewable energy
- Ecodesign of goods and services and ecoefficiency of the production process
- Sustainable management of residual materials
- Green buildings
- Zero carbon transport and sustainable mobility
- Sustainable agriculture and fisheries
- Conservation and sustainable management of biodiversity, water, forest and soil
- Sustainable tourism
- Green training and employment
- Ecological accounting tools and green financial mechanisms

Based on this list, the government has developed a combination of policies, strategies, and action plans to support R&D activities and promote green public and private investment (Government of Quebec, 2012b). Some of these initiatives include the Green Fund, which is designed to channel tax revenues from residual materials and gasoline purchases towards programs centered on the environmental components of sustainable development. Other programs help farmers adopt organic agricultural practices (PRIME-VERT), offset the impacts of Quebec's massive development project, Le Plan Nord, and provide 237.5 million in financing to support the development of the green technology industry. Broader strategies include the Sustainable Forest Development Act; Quebec Public Transport Policy; 2006-2013 Climate Change Action Plan; Electric Vehicles; 2011-2020 Action Plan; and the Regulation respecting a cap-and-trade system for greenhouse gas emission allowances (Quebec Government, 2012b). Such strategies, which were largely a result of

past sustainable development efforts, are now also viewed as key components of Quebec's future green economic development.

These technologically oriented strategies represent a significant shift in the environmental consciousness of the Quebec government and have led to the development of a wide range of programs and resources, many of which support the various stakeholders and member groups of Écotech Quebec (as I will discuss later on). However, as noted above, such green economy initiatives are not developed solely to protect the environment and well being of the population; they also represent the desire of the government and private sector to profit from new markets created by the environmental movement in order to prop up capitalism (Brand, 2012; McCarthy and Prudham, 2004; Shear, 2010). To begin to illustrate this point, a close examination of the government's green economy documents reveals *few* concrete examples of the ways in which the social components of the green economy initiatives will be tackled. And to the extent that social support is provided, it is oriented to bottom-up, entrepreneurial approaches to redressing social inequities. More specifically, as a part of the "Social Rehabilitation and Poverty Eradication" portion of this framework, there is mention of an investment of 16.7 million to provide "local and regional communities with the means for energizing their communities and meeting the needs of residents through collective enterprise'' (Government of Quebec, p.45, 2012). And part of this funding was allocated to a study to highlight on how social enterprises could enhance poverty alleviation and foster social inclusion. There is also mention of how funding (no specific amount is indicated) is offered to regional districts to improve public transportation for low mobility individuals; of how socially disadvantaged people are hired by "some" recycling centers as a method to encourage social integration; and finally how the Société d'habitation du Quebec will

be responsible for the retrofitting of low-income households to improve the energy efficiency of these buildings as examples of the strategy's social considerations.

While these efforts are important, programs for green technology companies, by comparison, are alloted 37$ million in financial support and a further 237.5 $ million is earmarked for the more general support and development of this industry. Meanwhile, excluded from this strategy is any discussion of training programs that would enable marginalized groups or the unemployed to acquire green jobs. There is also no mention of ways to encourage meaningful participation of community groups or citizens in this initiative nor how the revenues resulting from these actions would be reinvested in the Montreal community. Thus, when comparing the financing and support available for the social programs of this strategy with the economically oriented environmental programs, there is clearly a greater emphasis on the latter suggesting that Quebec's strategies are following suit with the dominant green economy trends that typically undermine less economically viable components of this movement (Shear, 2010; Brand, 2012).

As we will see, the construction of new 'green economic' boundaries via the redistribution of resources as well as the creation of sociotechnical objects, discourses, and legislation can serve as a powerful mechanism of control which facilitates the appropriation of previously unexploited sectors (Mitchell, 2007). As I will later demonstrate, the manner in which Écotech Quebec is defining its particular role as the province's cleantech cluster effectively guarantees that resources from the provincial government's green economic initiatives are directed in support of their project; and, by extension that other initiatives are excluded from these financial resources and programs. To begin to illustrate this point, in the following section I highlight the programs, experts,

and financing designed to implement Montreal's cluster strategy, a key policy "imaginary" from which Écotech emerged.

Cluster Strategies in Quebec

One of the most significant initiatives to emerge from the broader shift to an environmental orientation was the adoption of a cluster strategy as an important means to promote the green economy. Within the past decade, the cluster strategy has become a central tool in most important economic development toolboxes world-wide, and this popularity can be attributed to the work of Michael Porter, a Harvard University Professor who works with a variety of different international, federal, and local policymakers, in addition to publishing his theories in both academic and industry circles. According to Porter (2000), clusters are defined as "a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities" (p.16). The close proximity of these actors is said to foster relationships which can enhance knowledge-exchange that underpins innovation and productivity. As well, a visible concentration of actors within a given sector can attract foreign investment, thereby boosting the economic competitiveness and growth of city, region, or state (Porter, 2000). Today, cluster strategy is heralded by supranational organizations such as the OECD and the World Bank as an important driver of global competitiveness; and it has become an integral part of Quebec and Montreal's economic development agenda (see for example, Ville de Montreal Economic Development Plan 2012-2017).

More specifically, the cluster model made its way to Quebec in 1991 via former Montreal mayor Gerald Tremblay who was serving as the Minister of Industry, Science, Commerce and Technology of Quebec (1984-1994) at the time. Having attended Harvard business school with Michael Porter, Tremblay worked to establish several different sectoral clusters in Montreal based on Porter's book *The Competitive Advantage of*

Nations (McDonald, 2012). However, according to the Economic Development Coordinator at the CMM (Communauté Métropolitaine de Montreal), Yves Charette[7], this initiative ultimately flopped (Interview, Economic Development Minister, CMM). This was primarily due to the top-down nature of the initiative, the fact that they were run by government officials as opposed to industry members, and most-importantly their focus on job creation vs. innovation (Interview, Economic Development Minister, CMM). There were also problems related to cluster theory itself. As Yves Charette explains, "Porter was really theoretical, he explained how to design a cluster and how to recognize one, but he never succeeded in saying how we set it up and how we activate it" (Interview, CMM). Therefore the theoretical foundation upon which Montreal's initial sectoral clusters were built was inherently flawed.

Regardless of this initial failure, which caused a blackout in Quebec's cluster development from 1995-2003, cluster theory was reintroduced by the CMM in roughly 2005 (while Tremblay was still serving as Mayor and also the Chairman for the CMM) (Interview, Economic Development Minister, CMM). Serving as a metropolitan-wide planning, coordinating and funding body, the CMM is run by about 28 different elected officials from its member municipalities. Among other activities such as social and affordable housing and land use planning, the CMM is responsible for creating regional economic development plans that span Montreal and adjacent smaller municipalities. Some of the key objectives of the CMM's 2005 Economic Development Plan (which is

[7] Yves Charette has a Phd in economics from Mcgill University and an MBA from the University of Ottawa. As well, M. Charette attended the University of Chicago where he took courses in business management. He joined the Federal Government in 1981 where he worked for 12 years as an economist in several different departments. He recently worked on two major international development projects: (1) CLUNET (a cluster policy development project) with the European Union as well as (2) NUTEK (a regional development strategy) with the OECD. He has since worked at the CMM for the past 10 years where he currently holds the position of Economic Deveopment Coordinator.

still used today) are worth mentioning here, since as we will see later there are strong correlations with Écotech's own objectives and mission as well as links to cluster theory. Some of the goals are as follows:

> "Montreal must become one of the most competitive metropolitan areas in North America. To accomplish this, the CMM has articulated a four fold strategy: Montreal must become a learning region, competitive and prosperous, attractive and world class. And the way to achieve this is through knowledge, productivity and innovation, attractiveness and foreign direct investment'' (CMM, Economic Development Plan, 2005).

Developing industrial clusters is "one of the focal points of the CMM's economic development plan" (Terms of Reference, ADEC, p.5), which is not surprising as Porter (2000) and others have argued that cluster development can effectively realize many of the above mentioned economic goals.

In order to reintroduce cluster policy in Montreal, the CMM began to develop and promote what they refer to as "Clusters of Innovation" by working with European consulting firms and utilizing the more applied methods put forth in a University of Stockholm study, and the Harvard Cluster Mapping Initiatives, while still drawing heavily on Porter's work (Interview, Economic Development Minister, CMM, 2013). This bottom up approach would serve to not only promote productivity, innovation and enhance competition, but it would also be well suited to nourish Montreal's burgeoning knowledge economy (Interview, Economic Development Minister, CMM). Based primarily on the University of Stockholm's conclusions[8], but also modified by Charette and his team, the

[8] The University of Stockholm's conclusions are summarized in the "The Cluster Policies Whitebook". This document presents policy recommendations concerning cluster development, the strengthening of clusters, and describes how clusters can enhance competition and innovation. As well, the role of certain actors, the competencies needed in a cluster development and how this will change in varying

CMM created what they refer to as Terms of Reference for Implementing Cluster Initiatives (2009). The document serves as a uniform model that each cluster initiative is required to adhere to during its development. This 18 page document presents the CMM's definition of clusters — which is a direct citation of Porter's definition of an industrial clusters — various promotional and identification strategies, as well as the major phases and steps involved in cluster development. Since this model was directly applied to Écotech, a review of the specific phases that it stipulates is warranted.

During step one of a cluster initiative, interested stakeholders must identify the key players in each industry, bring these actors together, and demonstrate a critical mass of industry firms and institutions (CMM, 2009). Once this is complete, step two involves finding a champion: a CEO of a major enterprise that agrees to lead a provisional board of directors in the creation of a cluster. If the right people are involved this process is quite straightforward:

> "So if you want to create a cluster system, an industrial group of IT or Aerospace or something, you say, 'ok so I want to get into the cluster system, we have 9 right now and they say, "we want to be a part of that and we want to profit from the programs, the strategies and the money that comes with that. (...) So obviously there are people interested in coming together, so what we do is say, 'well you need to follow the business model' and then the champion calls us (...) the CEO of the biggest enterprise will call us and say, 'I have a gang of friends here and we would like to have a cluster', so we say (motions handing them the document), that's all (Interview, Economic Development Minister, CMM).

Once this group is established, they are required to present a feasibility study and business case (e.g. maps, budget, description of project) to the CMM and public funders. If the group receives approval of their business case, they will then receive a sum of $200, 000

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circumstances are also highlighted (See http://www.hse.ru/data/2012/08/08/1256387033/The_Cluster_Policies_Whitebook_-_IKED.pdf).

towards the project's implementation with 50 percent of the financing provided by Quebec government and the other 50 percent coming from the CMM. This is then followed by step 3, which involves the creation of a three year business plan and a 10 year development plan, which the group can contract out to consultants to create.

Step 4 of this process is referred to as the activation period during which the appointed cluster secretariat implements the business plan, prepares operational budgets, and completes other funding activities. At this point the cluster can receive up to 400,000 dollars from public funds and a minimum of 200,000 dollars from private investors towards the necessary operational costs, although once the cluster is in full operation it can maintain revenues up to 800,000 dollars annually with additional income from various Ad Hoc projects (Interview, Economic Development Minister, CMM). For example, the Aerospace cluster receives between 1.5-2 million dollars in revenues (Interview, Economic Development Minister, CMM). The final step of the process involves submitting follow up reports, which the cluster must complete on an annual basis, even though the cluster's funding will be allocated over three years.

From Aerospace to Écotech

In the beginning, convincing the Quebec government to support this initiative was a difficult task due to the tarnished reputation of the previous cluster project in Montreal. As Yves Charette describes "nobody believed in this [the Terms of Reference for Implementing Cluster Initiatives]. When we first issued this I mean we made total fools of ourselves. Go to the chamber of Commerce with this document, I mean they would kick us out of all of the meetings" (Interview, Economic Development Minister, CMM). It

wasn't until the CMM successfully rallied the aerospace sector to start a cluster that their projects received the necessary support from the government.

According to M. Charette, it was in 2006 when Bombardier (a world renowned Quebecois Aerospace company) was in need of political support for a massive project to develop their C-Series aircraft – a project that would require a huge amount of financing for R&D activities – that the company first approached the CMM:

> "(...) the only way to get political support in the region here, there are two places you have to go to, either the Chamber of Commerce or the CMM. Now if you want pure political support you go to the CMM because that's all we do. So they came here and they said we need you guys, and Gerald Tremblay at the time said, 'I'm going to call the Minister in Ottawa and I am going to call the Prime Minister in Quebec, now don't you think it would be better, because I am not going to do that every week, so don't you think it would be better to be organized in a cluster? (...) and that's how we found the champions for the cluster, because they needed us and we needed a cluster, and they never regretted it after that" (Interview, Economic Development Minister, CMM).

Having the major "champions" from the Aerospace industry (Bell, Rolls-Royce, Pratt & Whitney, Aero Def Tech and Bombardier) sign on to the CMM's cluster initiative is part of what opened the floodgates for other clusters to develop in Montreal (Interview, Economic Development Minister, CMM). As M. Charette explains,

> "And once we had aerospace we went on to the second one, which was probably IT, same thing, but once you get the first one, then Aero Montreal becomes a star and it works, people go to the meetings, they do projects and stuff like that, so it's easier to get number 2, and even easier to get number 3 and number 8 well...after number 3 it's just cold calls that you get from the industry. I got one this morning from someone in fashion and design, a cold call" (Interview, Economic Development Minister, CMM).

This eventual acceptance and proliferation of the CMM's clusters was also related to the fact that Montreal was void of any industrial policies since 1991 (i.e. Tremblay's sectoral

clusters), a vacuum, which according to M. Charette was largely what enabled the CMM to gain the necessary 18 million dollars from the provincial government to expand and operate their cluster initiative (Interview, Economic Development Minister, CMM). While it was harder to establish the initial support from the Chamber of Commerce and other "industries in the city" the fact that Tremblay was involved, once again, in this initiative also helped: "(...) because at the City of Montreal Gerald Tremblay was the mayor, so he would tell his guys you know you better listen to what Yves says, so we didn't have any problems with the city and we didn't have any problems with the Government of Quebec, for the same reason" (Interview, Economic Development Minister, CMM).

Montreal's success with cluster development has garnered international recognition from the European Union in relation to the cluster working groups of the institutions Innovation Policy:

> "(...) we managed to convince them to have Montreal as number 15 and to consider us as a European city for the purpose of the program and so we worked on this initiative for 3 years with those major cities (...) they accepted because we became a benchmark in terms of cluster policy throughout the world, so our recipe works and people are trying to copy it" (Interview, Economic Development Minister, CMM).

Gerald Tremblay recently met with the Israeli government to learn from their policies on innovation, but also to share Montreal's experience with cluster development with other countries (Ville de Montreal, 2012). Today there are a total of eight different Metropolitan clusters in Montreal, Écotech being one of the latest editions to this initiative (http://grappesmontreal.ca). The stakeholders involved in a cluster strategy range from private sector to different levels of government to universities (e.g. Concordia University

is a member of the Innovation Working Group for the Aerospace cluster and operates an Institute for Aerospace Design and Innovation) (http://www.aeromontreal.ca). According to former mayor Gerald Tremblay, Montreal's cluster strategies have successfully "allowed Montreal to free up its creative capital, inspire innovation and increase its international competitiveness. Today, Montreal's entire production system relies broadly on this strategy'' (Concordia University, n.d.).

Conclusion

This chapter has presented a brief portrait of the various political programs, policy experts and relationships that are contributing to the "imaginary" of Quebec's green economy. As discussed above, the province has adopted a technologically centered approach to their green economic strategies; one that is largely influenced by policy transfers between the UN and the Quebec government. Similarly, the CMM has adopted the enormously popular cluster strategy (which is also influenced by policies and exchanges with the EU and OECD) as the heart of Montreal's economic development policies a move that predates — and anticipates — the creation of Quebec's cleantech cluster. By foregrounding entrepreneurship as a basis for innovation and economic development and by popularizing a shift away from public sector coordination or governance, the CMM's economic strategies promote prevailing neoliberal doctrines. As we will see the above-cited policy orientations and paradigms have significant implications for the development of Écotech, an organization which is at the forefront of promoting and accelerating Quebec's transition towards the green economy. In the next chapter I trace the history of the creation of Écotech and discuss the institutions current objectives, activities, financing, and implicated actors in order to examine the boundaries these projects help to produce and the implications of this initiative.

Chapter 4: Ecotech Quebec

In this chapter I will describe the ways in which a particular "metrological project[9]" Ecotech Quebec is competing to construct Quebec's green economy imaginary. Following Mitchell (2008; 2007; 2010) and Latour's (2005; 2004) arguments, this analysis seeks to investigate how sociotechnical arrangements construct "the economy" through the production of economic knowledge, agencies, images, and other techniques, which serve to exclude or include certain actors in the object they produce. As Mitchell (2007) argues, one can achieve the latter "by tracing the history of a movement; it's methods of organization: its political projects; the sites of economic knowledge it brings into being; the kinds of representation it makes possible" (Mitchell, 2008. p.1121). Drawing also on actor network theory, this study will employ detailed empirical descriptions to trace the various actors which are comprising Quebec's cleantech cluster (Latour, 2004). In turn, the objective is to denaturalize such projects (Mitchell, 2008; Gibson-Graham, 2003). While Ecotech is not the only agency performing Quebec's green economy (e.g. the provincial government is also promoting this paradigm shift) at the municipal level, it is the cleantech cluster alone that is showcased as what will make Montreal a "leader in the green economy"[10], therefore a closer look at the organization's activities reveals much about Quebec's green economic future.

This chapter is organized as follows. First, I discuss the history of Ecotech, highlighting the various spokespeople and relationships involved in the creation of this project. Second, I present Ecotech's definition of clean technologies, their key objectives,

[9] Metrologies "create and stabilize objects" (Mitchell, 2008). This term was originally coined by Latour (1987) who defined it as "the gigantic enterprise to make of the outside a world inside which facts (…) can survive.

[10] See Montreal's "Community sustainable development plan 2010-2015" (available at: http://ville.montreal.qc.ca/portal/page?_pageid=7137,79233642&_dad=portal&_schema=PORTAL)

and the different activities in which the group is involved. This will be followed by a brief discussion of the group's marketing techniques, which also serves to prop up the latter's representation. Finally, drawing on the information gathered from qualitative interviews with member groups and other empirical data, I engage with the broader debate concerning sustainable development in order to critically assess the kinds of activities and actors that are privileged within the current framing of Ecotech and further problematize the position of clean technologies as representing Quebec's green economy.

The history of Écotech Quebec

The creation of the cleantech cluster was initiated in 2007 by Alan DeSousa[11] who serves as the mayor of the Montreal borough Ville St. Laurent and has been member of the CMM's executive committee for 11 years: responsible for sustainable development, economic development, and finance, and currently acts as Vice-Chair of the group. Working in collaboration with the Conférénce régionale des élues de Montreal (CRÉ), the City of Montreal, Technoparc St. Laurent, and Technoparc Angus, this project was viewed as the nexus between DeSousa's political responsibilities and was informed, in part, by his experience at the Earth Summit Conference (UN) in Johannesburg in 2002 and the succeeding literature produced by this meeting (DeSousa, Interview, 2013). According to

[11] Alan Desousa, has been the mayor of the Ville St. Laurent borough since 2001 and ran as a candidate for the Équipe Denis Coderre party in the 2013 municipal election. He has been working on Montreal's sustainable development plans (2005-2009 & 2010-2015) in collaboration with other organizations since 2002. His sustainable development goals were inspired by his attendance at the 2002 Johannesburg Earth summit where members of the UN convened to discuss sustainable development (Interview, Alan Desousa, 2013). He also mentioned Ecotech's founder André Lise Méthod presence during this event. According to Desousa, the municipal sustainable development policies have also largely influenced the provincial sustainable development and green economy plans. Desousa is trained as a chartered accountant and before entering politics worked as Vice-President, Corporate Finance, of BioChem Pharma, and at the financial institute Ernst & Young. He also sits on the board of directors for Technoparc Montreal, a science parc and member of Ecotech Quebec and has worked on the development of the CMM's cluster strategies.

DeSousa, developing a cleantech cluster would not only serve to promote the economic pillar of sustainability, but would also help to build up Quebec's green economy.

Initially, feasibility studies conducted by the environmental committee of CRÉ revealed that the development of such a cluster would prove impossible. This was due in part because the critical mass to support an environmental cluster was insufficient and because there were no major leaders (i.e. CEO's) who could spearhead this initiative. This also had to do with the fact that Tremblay's environmental cluster of the 1990s was largely unsuccessful, a legacy that was still remembered when the viability of such a cluster was being considered (Vice President, Écotech, Marie-Pierre Ippersiel[12], 2013). Alan Desousa disregarded this initial study and requested a secondary analysis, which after a broadening of the definition of the cluster, proved the desired critical mass was there.

After presenting the project to major industry players, three "champions" agreed to act as founders of the initiative: André-Lise Méthod, President of Cycle Capital Management (one of Canada's first cleantech venture capital funds); Guy Droin, founder of Biothermica (Carbon and Energy Project Development, Landfill gas services, and Air Pollution Control solutions); and Theirry Pagé CEO of Odotech Inc. (electronic nose developers). The CRÉ then headed a pilot project with these three industry members and a series of other private and public enterprises, in addition to working with consultants to develop the cluster's business plan. Once the feasibility studies and the financing for the

[12] Marie-Pierre Ippersiel has a Phd. from the INRS where she studied "the relationships between science/industry and the technological support given by the Centres collégiaux de transfert de technologie to SMEs" (Écotech Quebec, 2013). Innovation and social proximity were also key areas of focus her research (Interview, Vice President, Écotech, 2013). Before becoming Vice President of Écotech Quebec Marie-Pierre Ippersiel worked as the research advisor at the CMM where she helped develop the Economic Development Plan of Greater Montreal in addition to the Cluster Strategy with Yves Charette. After working on the pilot project to initiate the cleantech cluster, she left the CMM to become Vice President of Écotech Quebec.

initial start-up phases were approved by the CMM, in March 2009 the project was launched at the Americana conference (International Environmental Technology Trade Show and Conference), and by Summer 2010 the organization was up and running with Denis Leclerc as President and Marie-Pierre Ippersiel as Vice-President of the cluster. Since then, Alan Desousa has remained one of the group's "biggest cheerleaders" by openly supporting Ecotech's member groups and activities, but as is the case with the other initial founders (e.g. CRÉ and City of Montreal), he is no longer actively participating in Ecotech's activities (Interview, 2013).

Financial support for the project was generally obtained following the steps outlined in the previous chapter (see discussion of Terms of Reference for Implementing Cluster Initiatives, 2009 in Chapter 4). In the beginning, however, financing was a challenge on some levels, since the group was unknown and clean technologies were still viewed as an unfamiliar sector. In addition, at the time Economic Development Canada had stopped financing cluster initiatives (as they were revising financing for NGO's), which narrowed funding possibilities for the group, a barrier that was eventually removed after significant political pressure by industry members (Interview, Vice-President, Ecotech, 2013). Écotech therefore initially acquired government subsidies on a per project basis, but today Écotech receives tri annual funding from the city, the provincial government, and the CMM that amounts to 1.2$ million in addition to 717$ thousand from Economic Development Canada (for the period of 2012-2015) (Interview, Yves Charette, 2013). This funding amounts to approximately 60 percent of the group's budget with the remaining 40 percent coming from private companies.

Denis Leclerc[13], President and CEO of Ecotech, who has worked for 20 years in Quebec's natural resource sector and has experience in management, media, government, public affairs, and sustainable development, was mainly responsible for attracting major private investors. Today, Écotech's prestigious partners include: Bell; Cascades; Cycle Capital Management; Davies; Deloitte; Desjardins; and Investissement Quebec[14], which provide tri annual funding (which was just renewed in January, 2013), in order to help cover operational costs. Écotech also receives private funding in smaller amounts from other private companies. This support is provided in the form of free office space (Investissement Quebec) as well as venue rentals and catering for different events (La Caisse Depot et Placement). Écotech also gains revenues by sponsoring annual conferences such as Le Sommet sur la Colline in Quebec City, in addition to invited speakers, workshops, and other events held throughout the year. These public and private investments allow Écotech to set membership fees as low as 250$ for small enterprises, which was a priority for the group, as this encourages small enterprises to join and thereby expand the cluster. Securing these financial mechanisms and the industry and government alliances were essential in developing the cluster, a task that was made possible due to the various "tools and arguments" developed by this network of experts, which I will present below (Mitchel, 2007, p. 261).

[13]Denis Leclerc also has experience in international projects with the U.S., Canada, Europe, and Asia, and has an MBA from the University of Sherbrooke. Many of the member groups cite working with Denis as one of the main benefits of joining Ecotech. Not only does Denis have extensive experience in related sectors in Quebec, but he is also cited as being an exceptional people person, having a large network of relationships to draw on, and being incredibly organized and efficient at his work, thereby serving as an excellent spokesperson for the cluster (Latour, 2005).

[14] Investissement Québec, as a mandatory for the Government of Québec, is one of the largest institutional investors in Canada. Through structural investments, it supports the growth of innovative companies with a global competitive edge and the potential to accelerate the transition to a green manufacturing economy (http://www.investquebec.com).

Une economie vert et prospere

According to Ecotech, this cluster is an important sustainable development initiative that will help accelerate Quebec's transition to a green economy, since clean technologies have the capacity to enhance all three pillars of sustainable development (Ecotech, 2013). A primary goal of the organization is to position Quebec as a "pole d'excellence" in North America for clean technologies by bringing together the different actors within the cleantech chain in order to help enhance the productivity and the competitivity of the industry (Ecotech Vice President, Interview, 2013). More specifically, the cluster's mission and vision are described as follows:

> Mission: Écotech Québec unites and mobilizes the cleantech industry around common goals and actions. It participates in the "greening" of the Quebec economy through sustainable development. It supports entrepreneurs in accelerating the design, development, adoption, commercialization and export of clean technologies (Ecotech, 2012).
>
> Vision: Écotech Québec helps position Québec as a centre of excellence for cleantech in North America. It is a major player in the development of this industry, which is recognized as an engine of wealth creation and prosperity. It helps make Québec more competitive, greener and healthier (Ecotech, 2013).

The vision and mission of the cluster were developed by the Ecotech team and also influenced by the initial feasibility studies and the cluster policy of the CMM, which by drawing on popular sustainable development and economic discourse, manufacture the boundaries within which the green economy and clean technology operate (Latour, 2005).

Constructing a particular definition of cleantech that would serve to govern the cluster proved difficult, as these technologies are transversal and the sector continues to grow and include brand new technologies (Vice President, Écotech, 2013). In addition, the problems that clean technologies are designed to ameliorate address a wide range of environmental concerns: air; water; soil; residual waste; and energy. Indeed, choosing how

to define an entirely new object involves significant work and boundary drawing on the part of their spokesperson/s that will have a major impact on the way in which, in this case a new sector will be governed (Latour, 2005). In the beginning, this resulted in Écotech originally accepting a much wider range of enterprises as members. As the Vice-President of Écotech describes:

> "In the beginning we had about 1000 organizations, but they were very environmental and for us we wanted to put an emphasis on the cleantech aspect, so value-added, the importance of patents, intellectual property...We really did a clean up of this list. We hired two consultants to help us who knew the sector very well and we did a filter, we filtered a lot of groups. We wanted enterprises that had very specific expertise, that had acquired patents, so intellectual property was important, but we didn't limit ourselves to patents, because an enterprise could be really innovative and have not yet declared what they have created (...)" (Interview, 2013).

After this filtering process, Écotech was left with approximately 350 groups that fit the above requirements (Ecotech, Vice President, 2013). Écotech then chose to base its definition of clean technologies on one used by a Californian enterprise called the Clean Tech Group[15], which was tailored to the Quebec context. While the above quote presents some of the key objectives that influence the groups definition of clean tech, the formal definition available on Écotech's website is as follows:

[15] The Cleantech Group defines clean technologies as follows: "Clean technology, or "cleantech," should not be confused with the terms environmental technology or "green tech" popularized in the 1970s and 80s. Cleantech is new technology and related business models that offer competitive returns for investors and customers while providing solutions to global challenges. While greentech, or envirotech, has represented "end-of-pipe" technology of the past (for instance, smokestack scrubbers) with limited opportunity for attractive returns, cleantech addresses the roots of ecological problems with new science, emphasizing natural approaches such as biomimicry and biology. Greentech has traditionally only represented small, regulatory-driven markets. Cleantech is driven by productivity-based purchasing, and therefore enjoys broader market economics, with greater financial upside and sustainability" (Cleantech group, 2013). This group is a member for the Global Clean tech cluster, as with Ecotech, who is heavily involved with the organization, and provides financial support for many of it's initiatives and activities.

> "Clean technology, also known as cleantech, green technologies, greentech, eco-innovations, ecotechnologies and ecotech, are part of a sustainable development outlook that includes new products, services, technologies and processes that: significantly reduce negative impacts on the environment (environmentally effective); offer users superior performance at a lower cost (economically superior); help improve quality of life by optimizing resource use (socially responsible)" (Ecotech Quebec, 2013).

Here we begin to see the decisions made by the group to systematically exclude and include certain actors, thereby designating "anti-groups", in order to establish the boundaries of the sociotechnical object, Ecotech (Latour, 2005). These actions serve to assemble activities that previously existed but were now canonized via their organization into a new emerging market, a cleantech cluster.

Although Ecotech's promotion of clean technologies is said to enhance sustainable development and address environmental issues, both the Vice President of the group and a board member have expressed a slight tension with linking clean technologies directly to environmental advocacy. As Vice-President of Ecotech's board of governors, Marie-Helene-Labrie clarifies:

> " (...) but cleantech is not about environment it is about innovation, entrepreneurship, it's about green. So it's the combination of innovation, technology, but technology for a green economy, so this is what is new. So what we bring to the table is really a vision for innovation and the green economy and how to make sure that the innovations we develop can be commercialized so that we can benefit from these new technologies, so that they can go through the whole chain" (Interview, 2013).

This emphasis on innovation, intellectual property, and value added technologies — as well as the discourse employed in Ecotech's "vision" — clearly embodies the neoliberal economic imperatives of the CMM, which places a strong emphasis on innovation and the promotion of a knowledge economy through clusters of innovation (see Chapter 4). When discussing the difference between Tremblay's sectoral clusters of the 90's and today's clusters, the Economic Development Coordinator at the CMM highlighted how the former

clusters were " (...) more about creating jobs and not creating innovation and for us we want to facilitate innovation, we could care less how many jobs there are in Ecotech, what we want is that Ecotech creates innovation and productivity, but they didn't have this reflex at the time" (Interview, 2013). An emphasis on innovation and technology can also be explained by the amount of government funding these key terms can attract (which is also evidence of the province's faith in neoliberal economic development). For example, both the Quebec and Federal government provide significant tax credits for the research and development phase of innovative technologies. As the President of one of Ecotech's member groups explained,

> "The R&D credit is also something that I think is quite interesting and the ongoing grants, so I have nothing to complain about. Sometimes you look on the flip side of it and you think maybe some money is being wasted because lots of people are living on that (laughs) and sometimes you just wonder if some projects are living artificially on that, because I mean you can tap innovation, because any time you raise the flag innovation you see like a grant here, a grant there …" (President, Celluforce, Interview, 2013).

This particular company received a total of 32 million dollars in grants from both the provincial and federal government towards the research and development phase of their "innovative" technology (President, Celluforce, Personal Interview, 2013). As well, most of Ecotech's member groups use the term innovation to describe the nature of their technologies and almost all of the member groups I spoke to received some amount of R&D subsidies for their technologies.

Ecotech's definition of clean technologies plays a key role in discerning which companies are able to apply for membership and in turn who will be permitted to access the networks and resources Ecotech gatekeeps (a more detailed discussion of the member groups will be presented later on). Along with the group's mission and objectives, it also

serves to build and secure powerful boundaries which dictate what kind of development (i.e. high-tech clean technologies) is considered sustainable and is therefore a part of Quebec's green economy — and simultaneously what is not (Latour, 2005). These definitions thus build the hegemonic facts that allow Ecotech to attract the required resources and attention and drown out the "contradictory voices" (p.31) of contenders (Latour, 2005). However, not all of the group's members are cleantech companies. Major unions such as the CSLN, different government agencies, and Universities are also included as member groups, which is typical of most cluster strategies (Porter, 2000). As well, the group's prestigious partners (e.g. investment institutions) are considered members. This exception is made because of the significant financial support they provide to Écotech, therefore as an exchange they gain access to Écotech's pool of members as potential clients or partners (Vice President, Ecotech, 2013).

Activities and marketing strategies

How are the mission and objectives put to work? In order to fix this new green economic cluster Ecotech organizes a diverse range of activities and projects offered to their members. More specifically, member groups identified two activities as key benefits to joining Ecotech: networking and lobbying practices, highlighting the particular strengths and resources of the group. As a representative one member group contends:

> "At the end of the day Ecotech has created enough of a buzz around clean technologies with the players in clean technologies, less so in Ottawa, but certainly in Quebec city. I think they have been real proponents for us and have been very good at getting member companies involved in the process" (Business Development Manager, Pyrogenesis, Interview, 2013).

In terms of lobbying, Ecotech employees meet with government officials throughout the

year to propose their various policy recommendations (Ecotech, Vice President, 2013). Ecotech was recently invited by the Consulate of the United States to discuss their cluster initiatives and potential business relationships, where Consuls agreed to be present at the Rendez—Vous Quebec/US Northeast (Oct 2-3, 2013), which was held in Montreal. Denis Leclerc, the President of Ecotech, travels regularly around the world (e.g. Finland, India, and Mexico) to discuss potential business opportunities and to promote the cluster. Today, one of Ecotech's major objectives is to lobby government in relation to the "innovation chain" for clean technologies (Marie-Pierre, Interview, 2013). While cleantech groups have access to ample tax credits for the research and development phase of their technologies, there is no support for the commercialization period, which one member group refers to as "the valley of death" as this costly phase can make or break a company (Enerkem, Marie-Helen-Labrie, Interview, 2013). Ecotech views increasing support during this stage of development as essential and recently presented recommendations to the Quebec government regarding the introduction of tax subsidy legislation for this period[16]. So far, these efforts have yet to inform concrete policies, but Ecotech's efforts have created a buzz around the issue and the government seems open to this possibility (Vice-President, Ecotech, Interview, 2013).

Another major activity organized by Ecotech in relation to lobbying is their annual conference, Le Sommet Sur La Colline. This three-day event provides member groups the opportunity to meet with elected officials in Quebec city from both the party in power as well as the opposition. Many of the member groups I interviewed attended this event

[16]According to M. Ippersiel this would cost the Quebec government approximately three percent of the annual $625 million spent on R&D development (Interview, 2013). Moreover, the only companies that could apply for this stage of funding are those who have also garnered funding at the R&D phase and applied for or acquired a patent, which are seen as key indicators of a companies success.

where they had opportunities to meet with politicians, but also partake in more specific activities. A board member of Ecotech, who sits on the regulatory framework and taxation task force, discussed how this particular conference also served as an occasion for his group to meet with government officials to discuss waste management legislation, which ultimately led to the group successfully influencing new government policy (Pyrogenesis, Interview, 2013). When discussing Ecotech's lobbying capacities, Pyrogenesis' business development manager explains how, "(...) we went out to Quebec city for the summit, but in the meantime we also met with the people at the environmental ministry, the MDDEFP (Development durable, Environnement, Faune, et Parcs), so they (Ecotech) are very good at that. Ecotech has been very good at getting us in front of the right people" (Interview, 2013).

In addition to the group's lobbying efforts, Ecotech organizes a wide range of activities to encourage networking to support the development of their cleantech members. For instance, workshops are organized to train member groups how to do "elevator pitches", a skill that can be used for other events where Ecotech will facilitate a platform where invited groups can pitch their various technologies to meet a specific companies needs (e.g. Ecotech meets with a group requiring specific technology adaptations and then invites the appropriate member enterprises to pitch their technologies to this company). Other workshops involve information sessions for members to learn about funding opportunities from government agencies or venture capital enterprises; special speaker events (i.e. local and international government officials); and cocktail events (Cleantech drinks). Ecotech both organizes and participates in group trips to different countries for members who wish to explore new markets and make international contacts, a program where member groups can apply for government funding to cover costs (e.g. bringing

member groups to California where they can learn more about venture capital). The organization also has a presence at conferences such as Americana, the International Environmental Technology Trade Show and Conference (organized by Reseau Environment), and the Rendez--Vous Quebec/US Northeast: Accelerating the Green Economy Corridor[17].

In 2011 Écotech joined the GCCA (Global Cleantech Cluster Association), a global "cluster of clusters" for the cleantech industry, yet another group of experts helping to prop up this initiative. Created in 2010, this organization represents 47 cleantech clusters that support over 5,000 cleantech companies in South America, Finland, California and the Middle East, for example (GCCA, 2012). More specifically,

> "The Global Cleantech Cluster Association (GCCA) creates momentum and moves the cleantech market by investigating, screening, and advising best in class Cleantech companies across the globe. GCCA guides cleantech companies from a compelling technology or service idea to viable business models, sustainable jobs, and attractive Return on Investment (ROI) for founders, incubators, and investors. GCCA is an independent, reliable and credible voice filtering out the noise in the Cleantech arena. (...) GCCA creates a conduit for next generation Cleantech companies to access global capital, networks, technologies, and markets to accelerate a global sustainable economy" (GCCA, 2012).

In describing his vision of the cluster, a GCCA founder explains, "I think there is a huge opportunity and upside to make tremendous amounts of money, lets be honest, in this space. So if I can do something that is interesting, I can do something that is good for the planet, and I can make a good return, I don't really see anything more attractive than that" (Lesser, 2011). This vision embodies very popular environmental liberalist discourse,

[17] This conference serves as a platform to enhance business opportunities in the green technology sector thereby fostering the alliance between Quebec and US enterprises. More specifically the conference will involve: Expert dialogues discussing innovation and its impact on improving competitiveness; Exclusive workshops targeting practical approaches and realistic outcomes to increase business beyond the border; A stage for world-class cleantech ventures to present their innovations; One-on-one matchmaking sessions with investors, R&D, corporations and industry experts; and Networking with potential buyers/partners (Ecotech Website, 2013).

which views capital accumulation and environmental remediation as compatible, despite their inherent contradictions, something we will explore further in the following section (Hartwick and Peet, 2003; Brand, 2010).

The GCCA's activities involve presenting awards in the form of exposure and investment to outstanding cleantech companies that have been nominated by their own cluster association, curating cleantech videos, and other relevant media on their website, as well as hosting numerous cleantech oriented conferences around the world. Ecotech's member groups Enerkem (Vice-President of board of members) and Celluforce were nominated for awards in 2013, for example. After having organized the first international conference in 2011 at the EcoCity world summit in Montreal, Ecotech's involvement with the GCCA entails exchanging best practices with the group and its members and serves as another opportunity for the Ecotech to enhance the networking opportunities for their own members (Vice-President, Ecotech, 2013). As well, Ecotech will participate in (and also support) the 2013 Clean Energy and Technology Summit in Atlanta[18], an event that will focus on the development (strategies, business opportunities, and challenges) of the cleantech industry. It is important to point out that the Cleantech Group (on which Ecotech based its definition of clean technology) and Investissement Quebec (one of Ecotech's prestigious partners) also act as primary sponsors to the GCCA, a point which highlights the interconnectedness of these companies and underscores the relationships necessary to advance these kind of economic projects (Mitchell, 2007).

As a complement to Ecotech's networking and lobbying practices, the group has also created five different task forces that work on the following themes: regulatory framework and taxation; financing; innovation & commercialization; branding &

[18] This event is also funded by Deloitte, one of Ecotech's key investors.

internationalization; and people. These groups are made up of different government and private enterprise officials who meet roughly four times (in some cases more frequently) a year to discuss the various challenges and opportunities in relation to their particular focus and to produce data based on their findings. In these settings, private sector members are asked to take off their company hats and think about the ways to foster the overall well-being of the sector (Vice-President, Ecotech, 2013). For example, the task forces organize educational sessions for member groups (e.g. concerning cap and trade legislation), produce research for government officials, and prepare policy recommendations (e.g. the commercialization project), knowledge that is crucial for the development of this sector.

In relation to both the group's networking and lobbying abilities, several member groups identify Denis Leclerc"s expertise and that of other key players (or "spokespersons") in Ecotech, as playing a major role in the success of these activities. As one member group describes,

> "I think it also helps to have a guy like Denis Leclerc as head of Ecotech, to have somebody who is vocal and has a presence. Denis is certainly someone that has that card (...) I mean he has really good contacts, he is very extroverted and he is full of energy so you see him in many places doing interviews and things like that so I think it is very good to have a guy like him when you are associated with ecotech'' (President, Celluforce, 2013).

According to the Vice President of Ecotech, Ecotech would not be what it is today without M. Leclerc,

> "He is dynamic, creative, he's a great PR person, he has done so much....The cluster, Ecotech, what it is today is thanks to him and of course we also work a lot, we help him, but it's the person that makes the difference sometimes in animating a cluster, this is really really important. He is really well connected in Quebec, he is well connected all over the place, he is always willing, open, he is also connected internationally and for me this is what has been a big part of Ecotech's success" (Interview, 2013).

These quotes highlight how Denis' role as "group maker" and "group talker" have been

essential to the construction of this cluster, serving to enhance the groups legitimacy, direct activities, secure relationships, and validate it's definitions (Latour, 2005). Other groups also highlight the influence founding members have on the group's credibility. For instance, company founders Andre-Lise Méthod (President of the Board of Directors) and Guy Droin (part of the regulatory framework task force and board of directors) are both CEOs of highly respected and successful cleantech companies and both contribute to Ecotech's activities as board members and task force collaborators. As one member highlights,

> "I mean Andre Lise leads a venture capital fund and they have several funds and so I think she is really well respected in the business community and the financial community and I think her power led to the credibility of the organization. I think Denis Leclerc has done a phenomenal job. He is very natural in basically being the embassador for clean technology in Quebec, I think I would use that word embassador. (...) I mean you also have Guy Droin who is with Biothermica and has a long history of technology development and is a very passionate individual as well and someone who has been leading our efforts so at least we have some traction with the Quebec government to actually create an R&D commercialization tax credit" (Business Development Manager, Pyrogenesis, 2013).

In addition to the founders, Vice President Marie Pierre Ipersiel's role in shaping the group is also significant. Before arriving at Ecotech Quebec, she studied innovation as a part of her doctoral studies which landed her a job at the CMM where she worked with Economic Development Coordinator Yves Charette to develop the cluster strategy for Montreal. She then left this position to work at Ecotech Quebec therefore her knowledge of clusters and her relationship with the CMM (which is one of Ecotech's main funding bodies) is brought to Ecotech. These networks of experts were not only essential to the initial creation of Ecotech but clearly play a key role in the continued success of this organization (Latour, 2005). The involvement of these actors also demonstrate the ways in

which the construction of Quebec's green economy is by no means an objective and "purely economic" process. Instead, it is exactly the actions of these powerful experts to successfully define, control, and arrange representations that give rise to a new "green" economic object (Mitchell, 2008).

The final project I would like discuss is Ecotech's latest initiative, entitled Switch (L'alliance pour une economie verte au Quebec). This project brings together major actors from the private and environmental sector: David Suzuki Foundation, Equiterre, Cycle Capital Management, Reseau Des Ingenieurs, L'association de l'aluminium du Canada, and Ecotech Quebec and is supported financially by Banque Desjardins, Enerkem (Member group, International Cleantech company), Innergex (International Cleantech Company), as well as the CSN. This unlikely alliance has the goal of accelerating the Quebec's transition to a green economy by giving this movement the necessary push to promote an innovative, resilient, competitive Quebec, and to enhance social equity, environmental health, and quality of life (Switch, 2013). By promoting conditions favorable to the development of Quebec's green economy, this initiative serves to foster an entrepreneurial culture of green development as well as enhance the economic competitivity of Quebec (Switch, 2013).

Currently, this group has disseminated documentation regarding how this transition should unfold in addition to curating media related to the green economy on their website, however, since the group is quite new (formed in Spring, 2013) there has yet to be any concrete actions established. With 50,000 dollars in funding from the provincial government, Switch has financed their initial reports, but is currently seeking more funding outlets to develop working groups and addition projects (Interview, 2013). I will discuss the details of these initiatives below, as it raises important questions about the

alliance between big business, non-governmental organizations, and the neoliberalisation of the environmental movement.

Marketing/Maps

On Ecotech's website and logo, the definition of clean tech is propped up by a variety "green" visuals (e.g. leaf symbols, blue and green font). This aesthetic was designed by a local consulting firm and similar themes were present in many of the offices of the interviewed member groups. For instance, a small start up Effenco, that designs energy efficient hydraulic systems used fluorescent green paint on certain parts of their prototype (which is on display upon entry to the building) in addition to a leaf motif in their logo. Likewise, another small enterprise, Vert.com used florescent green paint and other environmentally suggestive accent pieces (e.g. environmental photographs and fake grass) throughout their office in Montreal's Old Port, as well as a leaf motif in their logo. Other member groups use images of trees, grass, and nature in their marketing as well as images and/or videos of the technologies they are promoting. These types of visuals could be viewed as benign; however, they were employed by most cleantech companies interviewed and therefore contribute on some level to the construction of an "imagined industry" of clustered, collaborating, and productive green economic actors (Cameron, 2009; Mitchell, 2008). That said, when compared to the other activities that Ecotech organizes, these marketing strategies of course play a much smaller role in constructing Ecotech's economic object. These images are commonly used in the "green marketing" for a wide range of sectors, which most likely explains why the cluster adopted a similar aesthetic in the promotion of their project and to reinforce group-formation.

Other methods to promote the cluster are a Facebook page, weekly emails, a map

of the location and type of cleantech companies throughout the province, as well as a website entitled Vert.net where a video blogger interviews cleantech members. The Facebook page posts weekly updates on Ecotech's different events and media related to both the Quebecois and international cleantech industry and the weekly emails present essentially the same information. The Vert.net website and blog posted 8 videos in which Video Blogger, Véronique Paquette-Corriveau interviewed cleantech companies and spoke to them about their various technologies and the development of the cleantech industry throughout the summer of 2013. According to the Vice-President of Ecotech Quebec, this initiative serves to also present the type of careers available in this sector to a broad audience, since these videos were also published in the Gazette, Montreal's main anglophone newspaper, and the 24 Heures, a francophone newspaper published daily and distributed for free in the Montreal transit system (Interview, 2013).

Finally, Ecotech has also created an interactive map of clean technologies which comprises of a google map of Quebec and a series of different icons that you can select to see the location of the different cleantech actors (investors, renewable energy, eco-mobility etc.). Near the Montreal region the concentration of cleantech enterprises are greater, so as you move the cursor near this area, various symbols represent the number of groups present in each specific niche (see Appendix A). This map serves as a material representation of the cluster, thereby complimenting the other less palpable information and mechanisms Ecotech employs to represent their project. Although this is one example of how the cluster presents the geography of its members, the social proximity instead of the geographic proximity of Ecotech's members is a priority for this cluster. According to the Vice-President of Ecotech, if the activities are important enough to members they will travel the distance required to attend these events (Interview, 2013). For Ecotech, what is

more important is getting their members together to promote collaboration, hence the strong emphasis on networking in Ecotech's mission and activities.

Fixing the Clean-Tech Cluster as 'the' Green Economic Paradigm

By exploring the political projects, relationships, visuals, definitions, and activities of Ecotech Quebec, this section demonstrates the ways in which key actors in the organization engineer Quebec's green economic object and leverage the resources needed to develop and solidify the cleantech cluster (Mitchell, 2007). By defining clean technologies in line with popular economic discourse and dominant green economic paradigms the group's mission and objectives permit access to large amounts of government funding and support (Bohn et al., 2012). Credibility is enhanced by appointing key industry experts to found the group and sit on the board of governors, which further helps to attract key investors and financing. Financing is also secured via the talents of politically connected and highly educated experts that lobby the government to implement legislation in favour of Ecotech's objectives and raise awareness about the cluster via media sources, conferences, and documentation. Cluster policies transferred from the CMM are used to assemble the cluster and position Ecotech's goals and objectives (i.e. the emphasis on innovation, intellectual property, and productivity etc). One can also infer that the political relationships between the CMM and the Ecotech team (not to mention member groups, government officials and investment groups) facilitate the funding opportunities, operation, and visibility of the cluster. These networks of human and nonhuman relationships were required to secure, and continue to secure the power and control necessary to construct the green economic object that Ecotech has come to symbolize (Mitchell 2007; Latour, 2005).

As Mitchell (2007) argues, the capitalist economy relies on the construction of a boundary or line between "market" and "nonmarket" activities, the latter of which market rules are extended to, when deemed beneficial for the purpose economic development. This border is maintained through the creation of various sociotechnical mechanisms (e.g. property titling programs) that dictate what is inside or outside this boundary. However, as Mitchell (2007) explains, in understanding economics as performative, one should not focus on the representations or misrepresentations these processes construct, but rather the arrangements and exclusions they help to produce. This is because "what economics does (...) is not represent what was previously unrepresented, but try to reorganize the circulation and control of representations" (Mitchell, 2007 p.248).

The above section demonstrates the discursive construction of a new economic object, which is performed via networks of sociotechnical relationships, images, knowledge, lobbying, experts, and resources of Ecotech Quebec. Whereas Mitchell's (2007) case study of how Latin American property titling programs move "non-market" activities across a "constructed border" through powerful neoliberal programs, in the case of Ecotech Quebec, this organization does not work with markets that were previously "invisible" to the economy (although they were indeed less visible). Instead, I would argue that Ecotech's activities involve similar sociotechnical rearrangements and exclusions, albeit involving "already included" market technologies, that are selected and repositioned as a part of the cleantech cluster. This reorganization allows Ecotech Quebec to direct resources and power towards these showcased enterprises, which are now positioned as comprising Quebec's green economy, a practice that simultaneously defines what it is not. These actions have successfully reorganized the "circulation and control of representations" in Ecotech's favour as evidence by the funding the group receives, the

experts involved, the powerful endorsements they obtain, the media support, among other alliances Ecotech has secured.

Since this project is articulated as a sustainable development initiative (but also because the goal of this study is to denaturalize such sociotechnical projects) important questions are raised concerning who really benefits from the promotion of this project. In order to explore the implications of this initiative, in the following section I will examine the activities of Ecotech's member groups in order to offer an alternative account of Ecotech's representations, which I will briefly link to the broader debate about neoliberalism and the greening of capitalism. The next chapter therefore reveals the tenuous foundations on which Ecotech's representations are constructed and their implications for a sustainable development movement. Indeed, a closer look at the mandates of some of the organization's member groups reveal practices that prop up our dependence on fossil fuels, use green as simply an mechanism to differentiate products, or sell technologies to inherently unsustainable in sustainable industries in addition to other problematic practices, highlighting the inconsistencies between Ecotech's mandates and the activities in which their member groups are engaged.

Clean technologies representing the green economy

"The global capitalist economy can grow, if not with a clear environmental conscience, the one effectively assuaged" (Hartwick and Peet, 2003).

Neoliberalism emerged during the 1970s as political and economic project designed to dismantle Keynesianism and solve the crisis of Fordism (Prudham and McCarthy, 2004). While difficult to define given it's discursive and complex nature, neoliberal policies can be generally characterized by an unfailing faith in free-markets, the eradication of the welfare state, the deregulation of the labour market, privatisation, and free trade agreements (Le Heron, 2009). These tendencies are reinforced by efforts to promote defeatist, passive mindsets where job insecurity and economic instability are the norm (Stanford, 2008) in addition to the idolization of a hyper individualized worker identity where entrepreneurialism and independence is paramount (Harvey, 2005). Neoliberalism has also given rise to new modes of capital accumulation that counteract the gains of the environmental movement through the commodification of different socio-natures (e.g. carbon markets and pets) (Bakker, 2010; McCarthy and Prudham, 2004).

As McCarthy and Prudham (2004) highlight, liberal ideology has historically played a central role in restructuring social relations with the environment (e.g. via Locke's visions that led to the abolishment of the commons and the privatization/commodification of land), by constructing powerful social orderings that today legitimize attempts to commodify nature in order to "save it" (e.g. carbon trading, privatization, and user fees). Likewise, as Mitchell (2007) argues, the very tenets of property rules and contracts are what grant the compulsion necessary to make markets, albeit these rules are never static and are always "up for renegotiation, requiring new forms of enframing and disentangling, and the management of new frontiers" (p.245).

This type of renegotiation is seen with the rise of the environmental movement as one of neoliberalism's main contenders, as can be seen with the environmental regulations, discourse, and politics of the Keynesian-era, which were prompted by a strong concern for nature among citizens (McCarthy and Prudham, 2004; Hartwick and Peet, 2003).

While neoliberal proponents have worked tirelessly to eradicate these practices, they have also been forced to adapt to them. This is seen through the proliferation of "green capitalism", which according to McCarthy and Prudham (2004) has done "far more to smooth the roll out of neoliberalizations than attempts to dismiss or reject environmental concerns outright" (p.279). Examples of this are efforts to promote "liberal environmentalism" (i.e. which view ecological remediation and economic growth as compatible) through concepts of sustainable development and green economy, which have led to an ever-growing faith in these market based solutions that do not, and cannot solve inequality and environmental destruction (Bohm et al., 2012; Foti, 2009; Hartwick and Peet, 2003). According to Bohm et al., 2012, this is because these schemes to commodify nature (e.g. through carbon offsetting schemes and cap and trade agreements) serve only as a tool for Western companies to continue to grow by "offsetting" their practices via investments in "sustainable projects" as opposed to truly adapting their modes of production. In other words, these tools operate as a "neoliberal deflection" to appease environmental groups and to prevent organized political action (Hartwick and Peet, 2003). The results are increased profits (i.e. carbon offsetting has become a multi-billion dollar business) for those with the power and resources to develop such programs and the continued exploitation of weaker members of society and the environment; relationships that embody the inherent contradictions between ecology and capitalism (Bohm et al., 2012).

Neoliberal reforms and their relationship with the environment are complex, interconnected, and dynamic. Polanyi's dual movement theory can explain, in part, how one movement (e.g. that of economic privatization) will spur another (e.g. environmental justice campaigns) and how these paradigms will continue to infect and compete with one another throughout their development (McCarthy and Prudham, 2004). As a result, while businesses are cornered into adopting some level of "green" considerations in their mandates in order to continue to grow, in some cases environmental groups themselves are also adopting neoliberal rhetoric and ideology, a tendency which I will consider in the following section.

As some scholars have noted, understanding the complex relationship between neoliberalism and socio-natures requires the broadening of our definition of nature coupled with an examination of specific local neoliberalizations, which should be linked to broader neoliberal trends and similar case studies (Bakker, 2010). While Ecotech is undoubtedly promoting (and is a product of) neoliberal tactics and visions regarding how to fix and govern nature (i.e. marketization, market proxies, and privatization), the goal of the discussion here is to not dissect the specific relationships between these socio-natures and neoliberalizations, this would be outside of the scope of this immediate project and would merit further analysis. Instead, the above analysis is intended to preliminarily contemplate why these projects (i.e. building clean technology clusters as a mechanism to target environmental problems) have made their way to Quebec and why their adoption to manage environmental problems has become natural.

Quebec's clean technology enterprises

So far, I have problematized the creation of Ecotech's economic object by highlighting the exclusionary boundaries produced in this project. In the following section I seek to present additional data as to why Ecotech's efforts to position clean technologies as representing Quebec's green economy is problematic. In doing so, I will provide preliminary insight into the activities of Ecotech's member groups to explore the clusters claim to promote sustainable development through the support of such enterprises. Here I employ Giddings, Hopwood, and O'Brien's (2002) discussion of sustainable development as a framework (see Figure 3.0) to reflect on the activities of Ecotech member groups. Rather than providing a comprehensive analysis of the sustainability of these organizations, by drawing on the Giddings et. al. (2002) literature, I simply seek to illustrate how Ecotech's member groups activities fail to embody a balance between these ideals and consider their intrinsic connections, which would be necessary for the "green economy" to tackle the root of environmental issues (Shear, 2010; Brand, 2012). As I will show, Ecotech's member groups activities suggest a strong emphasis on developing profitable environmentally oriented technologies (e.g. economic & environmental sustainability) with a limited view of environmental issues and little consideration of the social components of sustainability.

Promoting "sustainable development"?

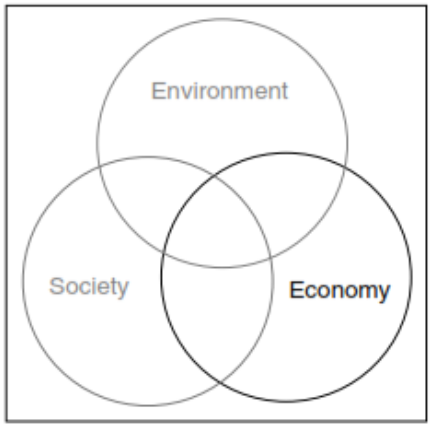

Figure 2.0 Traditional model of sustainable development

A myriad of organizations, administrations, and industry members have adopted the term sustainable development resulting in the production of a diverse range of interpretations of the concepts meanings and application. Sustainable development was originally defined in the Brundtland Report as "development which meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987). Today, the concept is often presented as embodying three key pillars: the economy, the environment, and society, which are traditionally presented as three interconnected rings (see in Figure 2.0.). For obvious reasons however, this division is problematic as it presents these three areas as separate when they intrinsically linked. This results in a limited understanding of nature, our relationships to it, and the separation of the economy from these material and immaterial realms (Giddings, et. al, 2002). Presenting these distinct categories also allows for the view that a trade off can be made between each sector (i.e. a company may promote economic sustainability while undermining the other realms) and promotes technical fixes (i.e. programs to tackle pollution instead of industry practices) to environmental problems as opposed to fundamentally rethinking our socio-

economic relationship to nature (Giddings et. al, 2002). These categorizations also reinforce the idea that the economy is a separate, rationale entity as opposed to a complicated mix of competing sociotechnical mechanisms (Mitchell, 2008).

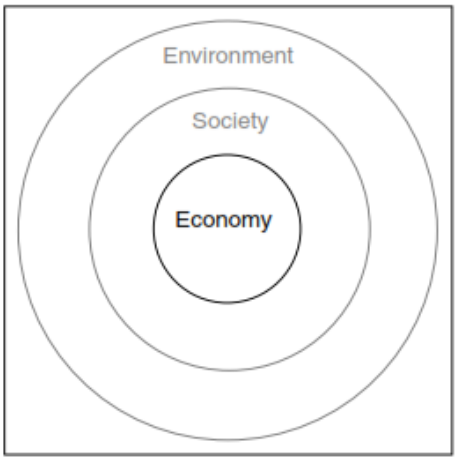

Figure 3.0 The nested model of sustainable development

As Giddings et.al (2002) highlight, most often the economy and the environmental components of sustainable development are often prioritized whereas the societal considerations — that would arguably tack the root of envirionmental issues — are undermined. However, if we seek to promote transformative visions of this concept, a more comprehensive view of sustainability that dissolves the boundaries between the economy, society, and the environment and expands the meanings of each of these entities must be adopted (Giddings et. al, 2002). According to these authors, "the [above] nested model rather than the three ring model encourages a conceptual outlook sympathetic to integrations" (p.192). This compelling view of sustainability echoes Shear's (2010) discussion of the green economy's potential to promote social, environmental, and economic well being and for examining the limits for Ecotech to realize this potential.

With these ideas in mind the below section will focus on Ecotech's members' practices and mandates in addition to Ecotech's latest initiative, the Switch Alliance, as

these activities illuminate the inherent contradictions in Ecotech's mandate and the the practices they promote. This critique is organized as follows: (1) a discussion of the production of technologies; (2) member group's business mandates; and (3) the markets for clean technologies. This is followed by a brief discussion of Ecotech's Switch Alliance. I conclude with a discussion of the implications of member group activities in relation to their position as representing Quebec's green economy.

Technology production

According to Ecotech, Quebec's clean technologies range from waste management, green chemistry operations (e.g. the production of chemicals that are less environmentally hazardous), GHG reduction technologies, and green IT technologies (e.g. technologies that reduce the energy use and space requirements of data centers). Before becoming an official member of Ecotech, these enterprises are assessed by the group to ensure they represent Ecotech's own missions and objectives (Interview, Vice-President, 2013). Today, Ecotech has approximately 350 cleantech members, a number which continues to grow weekly.

One way in which the limits of an ecology-capitalism link is revealed is in the production practices of a number of the member groups. Celluforce is a case in point. This is a Montreal based company founded in 2010 that uses pulp products to manufacture what is referred to NanoCrystalline Cellulose (NCC). This nanotechnology can be used as an additive to either strengthen materials (the crystal derived from chemical processing is what makes a tree stand up), make them viscose (this option could be used a food additive), as an antioxidant (which could be used in cosmetics to kill free radicals), or as a

gas barrier (e.g. for packaging materials) (President, Interview, 2013). Operating as a joint venture of Domtar (one of Canada's largest pulp and paper producers) and IP Innovations, this project was initiated as a way to revitalize the struggling forest sector in Eastern Canada. According to the company, "NCC is abundant, renewable, recyclable and biodegradable. It is expected to become a major contributor to the green economy in the coming decades, and should serve as a strategic platform for sustainable development[19]" (Celluforce, 2013). As the President of the company explains, "from a sustainability point of view it's wood, so you know it's a garden, so we are gardening (...)" (Interview, 2013).

The obvious question that is raised about this company's ventures is whether using massive quantities of wood products (or gardening) exemplifies an integrative vision of sustainability? By government standards, trees are considered renewable resources ostensibly because they grow back, but the history of the Canadian forest industry's ecological impacts is widely documented, revealing a multitude of practices which result in habitat loss, soil erosion, and that often take place in contentious spaces such as on indigenous land, or protected areas (Greenpeace, 2013). Developing potentially sustainable nanotechnologies that depend on the use of wood products may simply continue to degrade Canadian forests unless meaningful actions are taken to ensure that these practices are as environmentally friendly as possible. The sale or end use of the nanotechnology also needs to be considered: can the product still be considered ecologically friendly if it is being sold as a food additive, for cosmetics, or to be used to manufacture vehicles?

Prompt is a local non-profit which helps organize R&D research collaborations

[19] This product is just entering it's commercialization period therefore it's precise use is not yet determined.

between universities and the private sector in order to enhance the competitiveness of ITC (information and communication technologies) industry in Quebec (Prompt, 2013). This organization also manages 70 million in public/private investments (30 million from the province and 40 million from the private sector) for a project entitled Equation: A Major Green ITC Initiative, which involves the promotion of new Green ITC technologies (e.g. telco clouds, smart grids, environmentally friendly manufacturing processes and systems) that reduce GHG emissions and energy consumption (Equation, 2013). Developed in response to a growing concern about the carbon footprint of the ITC industry, Green ITC technologies have resulted in the emergence of a new industry with the potential to create 800$ billion dollars in annual energy efficiency savings (Prompt, 2013).

When discussing a part of his vision as to why Quebec is well-positioned to develop these technologies, the coordinator of the Equation project at Prompt explained how Quebec's hydroelectricity resources are at the heart of this initiative due to their "greenness", abundance, and low cost (Jacques McNeill, Interview, 2013). For instance, the development of this industry could result in companies locating data centers in Quebec for manufacturing or digital processing that would draw on the province's renewable and more cost efficient resources, thereby lowering their company's carbon footprint. As Mcneill explained, this type of exchange will clearly depend on the continued growth of Quebec's carbon markets (which were launched in January 2013) as these metrics will encourage the development of this industry[20] (Jacques McNeill, Interview, 2013).

Hydro electricity is commonly touted as a "green" and renewable resource as there

[20] I.e. since Quebec's energy is deemed "green", GHG emissions from manufacturing in Quebec would be less than in other countries where more destructive energy sources are used, so comparative data on the carbon emissions of other nations would be needed in order for these types of arrangements to make sense.

are supposedly zero GHG emissions associated with these developments; however, this claim is widely disputed and ignores the social impacts in addition to other ecological implications of these projects. In Quebec there is a tumultuous history to the Great James Bay Hydro development project as its completion has resulted in massive socio-economic and cultural changes for the Cree of James Bay (Carlson, 2009). The environmental impacts of this project involve an increase in biomagnification, habitat destruction, forest degradation, and a continual reduction in fish populations (CBC Archives, 2013). More generally, many studies have revealed that hydroelectricity can also increase methane emissions (a GHG which is said to be much more powerful than Co2) due to organic matter and sediment buildup (Science Daily, 2013) and the construction process of these massive projects are comparable to a mining operation in environmental damage (Interview, Id Energie, 2013). Because of the ample supply of energy Quebec's hydro dams can produce, the electricity is indeed cheaper; however, viewing hydro electricity projects as "green" is problematic for the aforementioned reasons. Therefore the investments into these ITC projects and other electricity oriented green initiatives (which are only just developing) raise some important concerns about the veritable sustainability of these initiatives.

Finally, as discussed in the introduction to this section, the development of carbon markets (on which the development of these technologies depend) privileges capitalist accumulation, relative to environmental sustainability, via the marketization of pollution (Bohm et al., 2012). In addition, focusing on environmental pollution (e.g. GHG emissions) can obscure the more fundamental causes for environmental problems: free trade agreements, deregulation, and unhinged economic growth (Hartwick and Peet, 2003; Bohm et. al, 2012). Indeed, talking about moving enterprises to Quebec so the province

can profit from this relocation, because our energy is greener than other sources in would not tackle the material realities of environmental problems, but simply rearrange their geography. These misconceptions can be linked to the ways in which sustainable development projects compartmentalize and prioritize certain elements of sustainability over others to appear "green" when many essential social, environmental, and economic considerations are undermined (Giddings et al., 2002).

Business mandates

Pyrogenesis is Montreal based cleantech company that specializes in waste gasification. More specifically, the company develops plasma incinerators that destroy hazardous waste that can then be transformed into a "Syngas" to produce electricity, construction materials, and other recyclable metals. Although the environmental and health concerns related to the incineration of waste are controversial, this technology claims to produce zero by-products. With 2013 revenues increasing by 57 percent, Pyrogenesis has been quite successful at marketing their product to those interested in the environmental benefits of the system and/or the cost effectiveness of the product (Pyrogenesis, 2013). When asked about how important the environmental component of their technology is, the company's business developer explains how:

> "Well with any market effort you have to know who you are talking to. (...) if I am talking to an investor there is certainly an advantage of saying we are a cleantech company, there is a huge advantage, because there is investment in clean technology companies and certainly we've got not only our environmental technologies, but like I said our plasma torches which enable a cleaner approach to processing materials (...) so I would call ourselves a cleantech company in that discussion. But if I am talking to just a customer who is looking to buy a piece of equipment well they may not care that we are a cleantech company they will just want our net result, so then with that company you talk about what the value proposition is, what's the return on investment, so what's in it for them, so they may or may not have environmental goals in mind, it's probably all about making dollars and cents, so it really depends who you are talking to" (Interview, 2013).

This quote highlights a common theme that emerged in many of my interviews: for 11 out of the 12 Ecotech members I interviewed, sustainable development was not always a key mandate for the company nor was it a determining factor as to why their technologies were sold. Instead, the fact that many of these technologies could be marketed as environmentally friendly seemed to be more of a differentiation method that would be employed according to the client, rather than an indication of their commitment to sustainable development. Cost effectiveness and the generation of profit thus played a much greater role in the development and sales of their products. When asked about the importance of the environmental aspects of their technology, Effenco Project Manager expressed how, "I mean everyone wants to do good for the environment, but in the end it has to make sense economically, it has to be profitable. Most of these companies are public companies, you know they have stocks, so all of their decisions are based on getting the shareholders money, so it's always the cost that decides" (Interview, 2013). As another member group highlights, "The way we see it in the market is that very rarely you have people doing green just for the sake of green, it's green for the sake of being green and becoming more cost effective and efficient in general" (Interview, 2013). The latter company's business model was specifically designed around achieving a 2-3 year payback

on the installation of their services, something which according to this enterprise was the maximum payback period for the private sector. Without these kind of deliverables, competition would make it incredibly difficult for companies to survive (Interview, 2013).

A related theme that emerged from the data was that many of the companies did not implement other sustainable oriented mandates in the operation of their organization. While companies could tout environmentally friendly alternatives to waste management, for example, no one discussed the more social components of sustainability (e.g. employee wages), or other realms of their business that could be considered sustainable (e.g. the transportation of their technologies, recycling practices, and green office spaces). As highlighted in the above quotes, the technologies being produced did involve some environmental component, but were mostly marketed and sold for their cost savings as opposed to their environmental benefits.

The "light green" practices that underpin Ecotech's so-called sustainable enterprises is further illustrated in the case of the Éco-campus Hubert Reeves[21]. Éco-campus is a 185 million dollar development in Montreal's Technoparc, an aerospace, life sciences[22], cleantech, and ITC science parc located in the St.Laurent borough of Montreal. Touted as a state of the art "international technology portal" with a mission to promote clean technologies and sustainable development, this Éco-campus strengthens relationships which enhance cleantech R&D and knowledge transfers, in addition to providing demonstration, consulting, financing, and business development services to its

[21] The project launch was also endorsed by St.Laurent Mayor Alan DeSousa (see beginning of chapter) who sits on the board of directors for the Technoparc.

[22] Cleantech has essentially replaced the life sciences segment of this science parc. According to the Director of Cleantech for the parc, Sylvain Ouellette, this shift has to do with the disappearance of government subsides for this industry in the 90s in addition to massive changes to the sector where most technologies are now being developed in China and India (Interview, 2013). Today there are only small enterprises as opposed to the massive corporations that were once present in this area.

members (Technoparc, 2013). The organization is currently working to increase the concentration of clean-tech start-ups at the Eco-campus and to foster the necessary conditions for innovation among residents. Many of these enterprises are smart grid or specialize in green ITC technologies, which the Technoparc's Cleantech Director Sylvain Ouellette views as the most promising clean technologies in Quebec, due to the provinces abundant green energy supply (hydro electricity) and the government subsidies made available for this new sector[23] (Interview, 2013).

While the emphasis on promoting this hydroelectricity/carbon market dependent industry is problematic for the previously discussed reasons, so is the specific location of this campus as it is being developed in an area that was formerly designated as a protected wetland. As Sylvain Ouellette, Director of Cleantech explained, gaining access to build in this space was difficult and required several years of negotiation with the Minister of Environment to obtain the necessary development permits, since the Ministry was reluctant to supply such permits due to the sensitivity of the region. Ouellette explained how the development of the Eco-Campus would still preserve 50% of the space for wetlands, forests, and local species — but had the project been denied this area would have remained entirely protected. While the buildings constructed will be built to LEED (Leadership in Energy and Environmental Design) standards, the space requirements and additional activities that will take place on this delicate parcel of land are questionable. In addition, the Technoparc is located off of the Highway 40, one of Montreal's main arteries

[23] Ouellette also described how Quebec's cheap energy supply has and will continue to hamper the provinces development of wind or solar energy as the latter technologies are too costly and involve low returns. On the other hand, electricity oriented technologies such as electric cars and green ITC, which draw on these energy sources will continue to flourish as they are widely supported by the provincial government in addition to being most cost effective (see http://www.mddep.gouv.qc.ca/developpement/rio20/initiatives_qc-en.htm) (Interview, 2013).

and consists of a myriad of highrise buildings, parking lots, and paved roadways. This development therefore illuminates yet another example of the contradictions involved in the promotion and development of Quebec's clean technology sector.

There was however one exception to the latter trend among the groups that I interviewed. Id Energie, a small start-up located in Griffintown, Montreal, initiated their project with the specific goal to find solutions for our environmental issues as the two founders hold a strong passion for sustainable development (Denis Bastien, Interview, 2013). For example, one of the founders discussed how his interest in sustainable energy and his new family compelled him to return to school to complete a Masters in renewable engineering at ETS. The other founder also returned to ETS at age 55 to pursue his passion for renewable energy, which is where and when the two met. Today, this group is working on the commercialization of small scale, portable hydroliennes, which can be used in the place of fossil fuel burning generators in rural areas where electricity is unavailable both in Quebec and globally. They explained in detail the way in which their hydroliennes do little damage to aqua fauna, can biodegrade, are made from non-toxic recyclable resources, and can provide inexpensive energy solutions for many who do not have access to energy[24]. This organization's authentic commitment to sustainable development was evident in their business mandate, the technology they develop, and their discourse: as such it represents one of the only companies I spoke to that appeared to be as concerned with environmental issues as the economic returns of their product.

[24] While having received significant support from ETS and government subsidies, this groups major challenge is overcoming provincial laws which are not adapted for the use of this type of technology. Whereas the government is aware of the environmental costs of massive hydro projects, this loss is seen as economically necessary in addition to the fact that Hydro Quebec holds the economic clout to offset or pay-off these practices (Interview, 2013). Overcoming these bureaucratic barriers will be difficult and costly for the small enterprise and poses a significant challenge in the development of their technologies.

Markets for clean technologies

Enerkem, one of Quebec and Canada's most heralded clean technology companies, develops second generation biomass ethanol (as opposed to the controversial first generation crop based ethanol) and chemical intermediates from waste and currently operates a pilot project in Quebec, a commercial demonstration in Westbury, with a fully operational waste to ethanol plant in Mississippi and a plant under construction in Alberta. This company's commitment to sustainable development is fourfold: *environmental by* diverting waste from landfills, reducing GHGs, and energy efficient manufacturing; *economic* through job creation (40-50 jobs per plant), the stimulation of regional economies through local equipment purchasing, and contributions; *community-oriented* through increasing energy security, diverting waste from landfills, compact footprint community based facilities; and *energy-focused* by meeting Canadian standards of renewable fuel blending, energy security and independence (Enerkem, 2013). Specifically identifying themselves as a green economy industry, this company received a total of 50 million in investments from Investissement Quebec (one of Ecotech's prestigious partners), in addition to investments from Cycle Capital Management (whose president is one of Ecotech's founders) and development capital fund, FTQ (Fonds de solidarité), among other investments which total 87$ million dollars (Enerkem, 2013). The company has also won multiple awards and has gained significant international recognition for their technologies (Ecotech, 2013).

While the practices of this group are indeed sustainable at some level, the sales of their product raises important questions. Due to Canada's new legislation that requires fossil fuel companies to blend five percent of their fuels with renewable sources, Canada's

oil companies are Enerkem's primary clients (Marie-Helene Labrie, Vice President, Government Affairs and Communications, Interview, 2013). Although there are clearly some potential benefits to converting waste so that it can be reused for fuel by selling their product to oil companies Enerkem indirectly props up the oil industry allowing it to continue to function in a relatively business as usual manner. While oil companies may add these renewable energies to their fuels, this option just allows them to appear "greener" and maintain growth while continuing to entrench our dependence on fossil fuels, construct ecologically and socially devastating pipelines, dominate the energy market, exploit foreign resources, and pollute the environment.

Venture capital group EnerTech Capital invests in energy technologies "that dramatically improve the *profitability* of producing or consuming energy. Whether *fuel* or electricity, alternative or *traditional*, we help create companies that make energy more efficient, reliable, and cost-effective" (EnerTech Capital, 2013) (emphasis added). Once again, the fact that this company works to promote energy efficiency enterprises may indeed help to reduce energy use, but this group's activities also involve promoting technologies that, like Enerkem, bolster fossil fuel production or other forms of "traditional" energy. When asked about the kinds of cleantech companies the group invests in, Vice-president of Investments Anne Marie-Bourgeois describes how,

> "(...) the cleantech definition is a very very broad definition (...) it has to have an energy angle (...) they have to either use less energy or produce with less impact...so that could be for example in the oil sands sector... we could have some technologies that help clean up the water or decrease the footprint, make the footprint better in terms of producing it in a better or greener way...so we don't necessarily call these clean tech, but they are in a way because they are all more efficient and more effective than the usual *bad* technologies (...) (Interview, 2013) (emphasis added).

The above quote exemplifies the ambiguity and tensions involved in defining clean

technologies and how even technologies designed to optimize oil sands development might be considered "clean". Moreover, even though they are a member of Ecotech, this VC classifies the energy sector as a subspace of cleantech while Ecotech classifies renewable energy and energy efficiency *as* cleantech, further highlighting the "contradictory voices" or definitions involved in group formation, which "spokepersons" must work hard to assimilate (Latour, 2005).

As Bourgeois explains, "when it comes to technology companies that have a huge potential, especially the ones that are destructive, they will require money to go further, so that is where money and the venture capitalists (who are very helpful and involved in the market and who have seen and have lived through a lot of problems that these companies have gone through) are helpful (...) (Interview, 2013). It is therefore precisely the propping up or masking of destructive practices of technology companies that creates new demand for this VC as it is these companies that require the extra investments and expertise (e.g. increasing value of company, marketing and sales expertise) of VCs in order to improve or "green" their practices (Bourgeois, Interview, 2013). Undoubtedly, these massive enterprises have the resources and power to attract venture capital services as they are much more likely to guarantee investment returns than say a small start-up. This exchange exemplifies how such a venture capital company may directly profiting from environmental degradation, instead of tackling its root causes, while simultaneously perpetuating fossil fuel development, thus joining the pool of other market-based, profit-oriented clean technology enterprises that constitute Ecotech Quebec.

Switch

The previous section explored the practices of Ecotech's member groups and highlighted the ways in which capital may be coopting the discourses and symbols associated with the environmental movement. In this final section I would like to briefly comment on Ecotech's latest initiative, Switch: the Alliance for a Green Economy, as this unlikely collaboration could signal the counter neoliberalisation of Montreal's environmental organizations among other concerns (Prudham and McCarthy, 2004). As described earlier in this chapter, the Switch Alliance is made up of the following industry members: Ecotech Quebec, Enerkem (a member group that is discussed in the previous section), Cycle Capital Management (Ecotech founder and Cleantech VC), Le Réseau des ingénieurs du Quebec (advocacy group for engineers), and L'Association de l'Aluminium du Canada (ACC) (a non-profit group that represents the Canadian aluminum industry). The NGOs consist of the David Suzuki Foundation and Equiterre Quebec. Representing a common interest of these constituent groups, the Switch Alliance has a mission to "accélérer le virage vers une économie verte afin de contribuer à une société québécoise *innovante*, résiliente, *concurrentielle* qui réconcilie équité sociale, environnement et qualité de vie" (Switch, 2013). Since this is a brand new collaboration the group has yet to develop any concrete projects, aside from acquiring 50 thousand dollars from the federal government for their initial reports, creating a website, and publishing various press releases regarding Switch's position on certain energy and environmental politics in Quebec.

What does this collaboration indicate? It is important to point out that while Enerkem, Cycle Capital Management, and the Réseau des ingénieurs du Québec (RDEQ) are members of Ecotech, the NGOs involved in this initiative and the ACC are not. While

the ACC's exclusion as a member may reflect more of a personal choice (i.e. since they would most likely fit Ecotech's criteria for membership), if we recall the definitions and the filtering process that Ecotech adopted in establishing their membership criteria, the non-technological and more explicitly environmental mandates of the NGOs might explain their omission. These prominent NGOs are temporarily included in a particular Ecotech activity, the Switch Alliance, but remain outside of the boundaries of the newly formed object Ecotech traces. Before elaborating on what is at stake in this collaboration, I will present a brief portrait of the ACC, the RDIQ, and the NGOs that make up Switch Alliance.

First, L'Association de l'Aluminium du Canada (ACC) is an organization that brings together Canada's three main aluminum producers: Alcoa, Aluminerie Alouette and Rio Tinto Alcan to represent Canada's aluminum industry (ACC, 2013). Operating ten smelting plants in Quebec, a part of the group's mission is as follows: "Ultimately, the AAC wishes that aluminium, with it numerous benefits, be given a bigger role in the road and mass transit infrastructures, as well as the automotive industry. This is dependent on aluminium being more manifest in bids and in college and university training" (ACC, 2013). In addition to this more economic component of their mandate, the ACC also seeks to integrate sustainable development[25] into their practices. A part of what the ACC claims makes their practices sustainable is that aluminum processing uses only Quebec's green

[25] Recently the decrease in a pod of St. Lawrence Beluga populations have been traced back to smelting operations, which previously dumped large quantities of these cancer causing agents into the river during the 1960s (Duboyce, 2009). Several other studies have revealed similar results in addition to the cancer causing effects the toxins produced by smelting operations have on human populations who reside near the plant (Martineau et. al, 2002). Although smelting companies claim that their processes have been cleaned up, there are many other environmental concerns related to these practices: crop destruction for farmers located near these sites, acid rain, and health concerns for plant workers (Pei Ling, 2012). The ecologically detrimental practices of smelting operations, regardless of their sustainable development efforts thus raise important concerns about the collaborations of this group and local environmental NGO's.

electric energy sources (making the smelters Hydro Quebec's largest customers using 14% of the systems energy production) (ACC, 2013). Other commitments involve supporting communities through job creation; fundraising initiatives; by funding Jazz Fest (Rio Tinto Alcan); by funding Montreal's Center for Sustainable Development (which houses Equiterre and the David Suzuki foundation) (Alcoa); among many other initiatives.

Second, Le Réseau des ingénieurs du Quebec (RDIQ) is an advocacy group for Quebec's engineers offering a wide range of services from professional development classes, documentation on the industry, and job posting services (RDIQ, 2013). Director General Guy Parent explains how engineers have been committed to sustainable development initiatives long before their alliance with Switch Quebec: "With all the climate change and stuff like that, we know as engineers that things need to change so its not just about being green for being green we are green, because we need to change" (Interview, 2013). Such environmental concerns are apparently not only an inherent part of an engineer's education, but are also a part of the code of ethics for engineers. Moreover, as Parent describes,

> "Engineers will bring the green solutions to the people. It's one thing to want the green solutions, but the engineers are the ones that will bring the green solutions, so thats where it comes from and that's why we are involved in the Switch Alliance, because we know it is our people that will come up with the technology. Engineers can understand the technological aspect of things" (Interview, 2013).

Third, Equiterre is one of Quebec's largest environmental organizations, with a strong mandate for sustainability, that organizes the distribution of local sustainable food with their CSA (Community supported agriculture) baskets, promotes environmentally friendly horticulture, and engages in environmental activism, among other activities (Equiterre, 2013). Recently Steven Guilbeault, Co Founder and Deputy, Executive

Director for Équiterre has been working to promote a "transition to a green economy" through collaborations with the Montreal Council on Foreign Relations and the Switch Alliance, speaking conferences with Andrée-Lise Méthod (CCM), Vincent Chornet and President and CEO of Enerkem, and by attending the recent Rio + 20 Summit in 2012. Guilbeault also writes a column, La Vie en Vert, for Montreal's Metro Newspaper where he recently discussed Switch's activities and in this context defined the green economy as "une économie à faibles émissions de carbone et à moindre impact sur l'environnement, qui renforce les entreprises en les rendant plus *productive* et plus *compétitives* tout en améliorant la qualité de vie des citoyens et en assurant *une grande équité sociale*" (Guilbeault, 2013) (emphasis added), explicitly invoking the UN's definition of this term (Guilbeault, 2013).

Finally, the David Suzuki foundation is one of Canada's most popular environmental NGOs that also operates an office here in Quebec. The foundations vision and mission is as follows: " (...) to protect the diversity of nature and our quality of life, now and for the future. Our vision is that within a generation, Canadians act on the understanding that we are all interconnected and interdependent with nature" (David Suzuki Foundation, 2013). One of the group's key goals is also to transform the economy, which they view would "help secure Canadians' high quality of life within the finite limits of nature through efficient resource use" (David Suzuki Foundation, 2013). This organization does not promote a specific vision of the green economy, although it does contribute to concrete initiatives, such as working with the B.C. government to help promote the creation of green jobs in the province. That said, David Suzuki (who has recently dissociated himself with the organization for political reasons) was recently interviewed by Democracy Now! at the UN Rio + 20 conference where he openly

criticized the conference and the promotion of this new paradigm arguing that there has been zero meaningful initiatives resulting from the 1992 Summit and that instead of greening "a totally destructive system" (p.7) we should instead "overhaul the economy. You can't change nature, but you can change our inventions, like corporations and the economy" (Suzuki, p.7, 2012).

As Prudham and McCarthy (2004) have argued in relation to Polanyi's dual movement thesis, if the environmental movement has influenced neoliberalism than it is also true that neoliberal policies have influenced environmentalism. Although this is only a preliminary observation, the Switch alliance may be demonstrative of this cross-pollination where we see big industry members forced to adopt an environmental mandate due to environmental politics, but where we also see environmental groups partnering up with big business in light of neoliberalism's dominance. This is seen in the adoption of UN green economy discourse by Equiterre's, Steven Guilbeault, but also more generally with Equiterre's and the David Suzuki Foundation's involvement with these industry members. As cuts in funding for environmental programs and NGOs are ubiquitous, both here in Montreal and the rest of Canada, environmental groups may now be in a place where they must welcome industry-financed office spaces[26] (both the David Suzuki Foundation and Equiterre are located in the Center for Sustainable development, which is funded by the Canadian Aluminum Association) and where they are forced to take the imperfect opportunities to advance their own projects via the political clout of fellow

[26] For example, the center of Urban Ecology's (a prominent Montreal non-profit environmental organization) annual financing from the CRÉ was slashed to 20,000 dollars for the entire year of 2013. This is a result of funding cuts to the environmental component of this organization. As the director explained, this required her to let go of several employees and projects, which has been detrimental to the organizations ability to achieve their objectives (Interview, 2013). As this group actually collaborates on several projects with the Montreal municipality and maintains a solid reputation in Montreal, one can infer that the funding cuts/or unavailable funding for other similar organizations must also be significant.

Switch collaborators and industry giants. Such compromises are present in the way in which Guy Parent of the RDIQ describes how the groups reached a common ground to promote Quebecs green economy:

> "Its really a contribution of all of the players. Some bring a certain angle and we certainly bring a certain angle at things (...) and I would say that everyone in this alliance and green economy thing has had to put some water into their wine, if I can say, it's just to understand that if we want our economy to take this turn towards a green economy than we need everyone on board (...) so the greener groups had to hold back a bit maybe and the industrial groups had to you know give some leeway, but everyone made some accommodation to make sure that our ultimate goal for a green economy has a strong positions that we can propose to our leaders. (...) Everyone got some of their interests answered, but everyone had to be flexible a bit" (Interview, 2013)

Due to its very recent formation and the lack of initiatives that can be assessed, any conclusions that are posted are tentative, at best; additional research regarding the implications of this alliance is warranted in the future. That said, certain preliminary observations can be made.

One key concern that the Switch Alliance raises relates to its members' use of dominant green economic discourse (which positions them as representing Quebec's green economic future). First, the ACC's involvement in this project could serve to deflect the undeniably massive environmental and social impacts of their operations (e.g. intense energy requirements and habitat destruction) thereby greenwashing this industry. Second, as I have shown in the last section, the sale of Enerkem's biofuels to oil companies serves to prop-up the oil industry and thereby undermines the sustainability component of Enerkem's project. Third, despite Ecotech's "sustainable" mission the activities of their members is more suggestive of an ecological-economic contradiction than resolution; consequently, the use of labels "clean technology" and "green economy" act as powerful

misrepresentations that render these practices invisible. These industry members' positions as green economy advocates may belie a more transformative version, since their mandates and activities lack a more comprehensive commitment to sustainability (Giddings et. al, 2002).

In order to understand why and how these actors have become the leaders of this movement despite their unsustainable practices, it is important to consider the dominant "green economy" discourse they promote. On the surface, the use of "green" terms may indicate progressiveness and indeed there are certain cases in which the green economy movement does embody a real transformation (Shear, 2010). However, in the case of Ecotech Quebec, the use of this vocabulary veils a privileging of capital accumulation *relative* to more environmental considerations (and associated actors) through an ecological remediation-economic growth 'fix'. Since the Switch Alliance is defined and accommodates similar activities, the likelihood that this initiative will lead to progressive sustainable development remains a question.

While the appropriation of such discourse by industry members might be expected industry in a context where certain environmental restrictions threaten to hamper their growth, Equiterre's explicit promotion of an ecology-plus-growth discourse and the David Suzuki foundation's involvement in this Alliance are more startling. Indeed, a growing rapprochement between industry and NGOs is a second issue that the Switch Alliance raises. Environmental groups may see this collaboration with other institutions as embodying the potential to push forward their own agendas, since these partnerships may adorn them with greater recognition and legitimacy to influence policy as opposed to working against these groups. They may also see it as an opportunity to force industry members to adopt greener mandates. However, it is important to remember that Ecotech

normally excludes NGOs in the usual cluster activities they promote, suggesting that the potential of these organizations to instigate change in this context may be limited. Additional research could explore the implications of the NGOs involvement with the group on their mandates and activities.

Conclusion

Ecotech claims to promote a sustainable industry of clean technologies, which will help accelerate the transition to Quebec's green economy (Ecotech, 2013). However, as I have sought, to illustrate, due to the ambiguous, market friendly concepts the group employs, this cluster allows for a wide range of clean technologies and activities to represent the sustainable development that will help realize this alternative economy. While some have argued that the green economy involves the potential for unlikely alliances that could lead to meaningful economic and social transformations (Shear, 2010), I argue that Ecotech's activities do not embody this potential. Instead, while operating under the pretense of sustainable development, Ecotech's activities ultimately promote exclusionary, profit oriented agendas that create new opportunities for capital to benefit from the commodification of nature. This is evidenced by the cluster's criteria or terms of inclusion, and is further suggested in a preliminary review of the practices of Ecotech's member groups, which appear to benefit from the environmental movement as a way to secure new profits rather than a platform to advance meaningful sustainable development (Giddings et. al, 2002).

Finally, it is important to highlight how the solution to this predicament does not lie in Ecotech or someone else producing a more accurate definition of the green economy (or clean tech) that could better represent what the cluster's activities entail. In fact, it does not matter that the representation is inaccurate, but just that it does its job to rearrange the distribution of resources and power in Ecotech's favour while suppressing any "contradictory voices" that may compete with its definition (Mitchell, 2007; Latour, 2005). In the same vein, it is also important to not to downplay Ecotech's actions as less powerful because they've been exposed as ambiguous, "mere representations". As

Mitchell (2010) argues, "the 'real' economic relations to which economic discourse refers have become the epitome of a material, non-discursive reality" (p. 91). In other words, the creation of misrepresentations or economic objects through exclusions and inclusions is "economics at work in the economy" (p.244); these are processes that have real life implications for the actors they affect (Mitchell, 2008). Ecotech's representations and initiatives therefore have the potential to greatly affect environmental governance in Quebec, which will in turn affect the citizens and natural environment of the province. The creation and actions of Ecotech Quebec thus exemplify the way in which economics perform "the economy", the power involved in this process, and of course a myriad of reasons why the sociotechnical practices that have come to constitute this economic object should be denaturalized.

Chapter 5: Conclusion

"You can't change nature, but you can change our inventions, like corporations and the economy. They have got to change" -- Suzuki (2012)

By tracing and reinforcing powerful boundaries to construct a new economic object, Ecotech successfully rearranged the clean technology sector as representing Quebec's green economy. While these enterprises were not external "non-market entities" (if such things were to exist) that could be improved by their entrance into the market (indeed these companies existed long before Ecotech Quebec was created) they were nonetheless less-visible and have gained significant power through their inclusion in this group (Mitchell, 2007). Once adorned as Ecotech members, cleantech companies gain greater access to political networks, financing, and contracts through the programs and activities that the cluster promotes (Interview, Ecotech Vice President, 2013). This new identity facilitates a company's ability to market their technologies as the specific shade of green that Ecotech Quebec promotes, thereby enabling them to broaden their potential clientele and contracts, while masking the unsustainable components of their practices.

As I have shown, the creation of this cluster required the work of politically connected and highly educated experts (Latour, 2005). By drawing on popular neoliberal economic discourse (e.g. cluster strategy, competition, innovation) and UN-inspired buzz words (e.g. the green economy and sustainable development), these actors successfully secured industry and government financing. Marketing tools, media, and maps were employed to construct a visual imaginary of the cluster and Ecotech's activities and task forces act to realize the group's goals and mission. The President and Vice-President of Ecotech as well as the CEOs of major companies act to define clean technologies, describing how they will contribute to green economic development and advocating for

the programs required to support their initiative. These actors have successfully reinforced the boundaries of the group making it such "a finite and sure thing (...) that in the end, it looks like the object of an unproblematic definition" (Latour, p.33, 2005). They have also subdued competing or contradictory voices by systematically identifying and excluding "anti-groups" from this project (e.g. as Ecotech renders them inadmissible and obsolete) in a process to further legitimate Ecotech's object (Latour, 2005).

What exactly is excluded from this vision? The green economy could represent a completely different movement, one that could incorporate more socially and environmentally progressive doctrines that also involve re-thinking the dominant economic paradigm itself (Shear, 2010; Cameron & Gibson-Graham, 2003). Such initiatives could empower communities, transform labour conditions, and promote social inclusion leading to the construction of a new "revolutionary imaginary" (Gibson-Graham, 2008; Shear, 2010). As I have argued however, the cleantech industries that Ecotech supports do not embody such commitments to sustainable development (in the radical sense of the term). Anything other than high-tech, innovative, and productive "clean technologies" are thus excluded from Quebec's green economy. As a result, those kept outside this boundary will not have access to the same resources that Ecotech has secured. This is manifested at the provincial level with their recent funding cuts to the CRÉ, which led them to decrease their environmental programs[27], which has in turn

[27] One of the environmental programs that was cut (20-50%) is referred to as Verdir, a program aimed to green Montreal's urban environment (Interview, Director, CEUM, 2013). For the CEUM this change resulted in a drop in their funding from 54, 000 in 2012 to 20,000 for the year of 2013. As mentioned earlier on these changes have forced the CEUM to cut jobs and hire employees on a per contract basis. It has also meant that they are unable to continue to develop many of their projects (Interview, Director, CEUM, 2013). It is important to highlight that the CEUM has worked for many years in partnership with the CRÉ and maintain a solid reputation and relationship with the group. One can thus infer that for less prominent, perhaps newer environmental organizations to apply for funding amidst these cuts is incredibly challenging.

deeply affected even prominent Montreal-based environmental organizations (Interview CEUM, 2013) (while Ecotech who is also funded by the group has nonetheless secured their necessary financing). This can be explained, in part, by both the provincial and municipal green economic priorities, which have a similar emphasis on promoting high-tech more economically oriented programs and targets, such as high-technology activities, relative to environmentally and socially progressive efforts.

In the case of the Switch Alliance, while environmental NGOs are normally excluded from the cluster, they are temporarily included as their restricted presence benefits Ecotech's project — a rearrangement that illuminates the malleable nature of these boundaries, once deemed beneficial to those at work in maintaining it (Mitchell, 2007). These processes of inclusion and exclusion are no accident, but rather an essential step in group formation (Latour, 2005; Mitchell, 2007). As I have shown, the creation of Ecotech should be understood as a performative process one that involves the work of many actors and things to design, operate, and make its object appear fixed and permanent (Mitchell, 2007). The power of this "object construction" is its ability to harness resources, convince people to believe in it, and ultimately create new economic knowledge that will eventually become common, unquestioned truth (Mitchell, 2007; Latour, 2005). Moreover, there was no point in which the creation of this object was simply a process of objective, asocial economics; rather, it was always a socio-technical project involving powerful individuals, tools, and financial arrangements that brought it into being (Mitchell, 2010). While the activities that Ecotech orchestrates and the enterprises they support do not represent the sustainable ideals they claim to promote, this is of no concern to the group and any attempt to properly represent their activities, as a solution to this issue would be missing the point. What matters is not the accuracy of the

representation Ecotech promotes, only its effectiveness at reinforcing the boundaries needed to reorganize the distribution of resources and control (Mitchell, 2010).

By denaturalizing the creation of Ecotech Quebec in this way, I hope to have "open[ed] up these sociotechnical processes to explication" (Mitchell, 2007, p.246). At the same time, by providing a preliminary assessment of the the contradictory practices of Ecotech's members I hope to open up the space for imagining alternative political possibilities (Mitchell, 2007) that counter efforts to green a economic system based on the need for perpetual expansion. What could these alternative possibilities entail? Cameron and Gibson-Graham (2003) call for a diverse economy, one that does not involve the predetermined, static, and all powerful rules of our current paradigm, but rather "an open ended discursive construct made up of multiple constituents" (p.17). In this vision there is room for both non-capitalist and capitalist enterprises as long as they both adopt values that acknowledge the interdependence of all those who produce and consume and thereby promote meaningful, safe, and sustainable jobs as well as modes of production (Cameron & Gibson-Graham, 2003). Likewise, Shear (2010) is also hopeful about the reform that rethinking the economy could promote and argues that a green economy movement could enable such practices. His case study of the Apollo Alliance in Massachusetts is evidence of such a transformation (see Chapter 2). According to Shear (2012), it is precisely the current economic and environmental crisis we face that has created the necessary discursive space from which new possibilities could more easily emerge.

However, the barriers to alternative practices remain high and new local imaginaries are required. In accordance with Gibson-Graham (2008), I would argue that in order for Quebec's green economy to promote truly sustainable development this will require both destabilizing the object that Ecotech is building and the green economy

principles that Quebec government promotes via community led-initiatives to rethink the economy and capitalism and to create diverse and sustainable community economies that acknowledge human-nature interdependence. This would likely entail a direct challenge to — rather than accommodation of — dominant discourses on the part of those NGOs that are best positioned to promote a competing imaginary (e.g. the David Suzuki Foundation). Such a counter-movement or counter-mobilization could open up the possibility for a broader alliance among a myriad of environmental groups that need to pool resources and information in the face of funding cuts.

My hope is that this research has shed light on what is at stake in Quebec's promotion of the green economy, but also, following other scholars, has helped to denaturalize "economics", which is arguably the first step in re-thinking the economy. Future research could explore industry and NGO collaborations such as the Switch Alliance in order to examine if and how contradictions emerge and the potential benefits resulting from these collaborations. It could also explore the more specific neoliberalisms which are at work in commodifying Quebec's socio-natures. The groups that were excluded from Ecotech, after the definition was narrowed to establish what constitutes their green imaginaries, and the opportunities and constraints such groups presently face could likewise be examined. Research such as this would further "denaturalize" the seemingly hegemonic conception of the green economy that is advanced by Ecotech and present the economy as diverse, contingent and still ripe for continuous definition.

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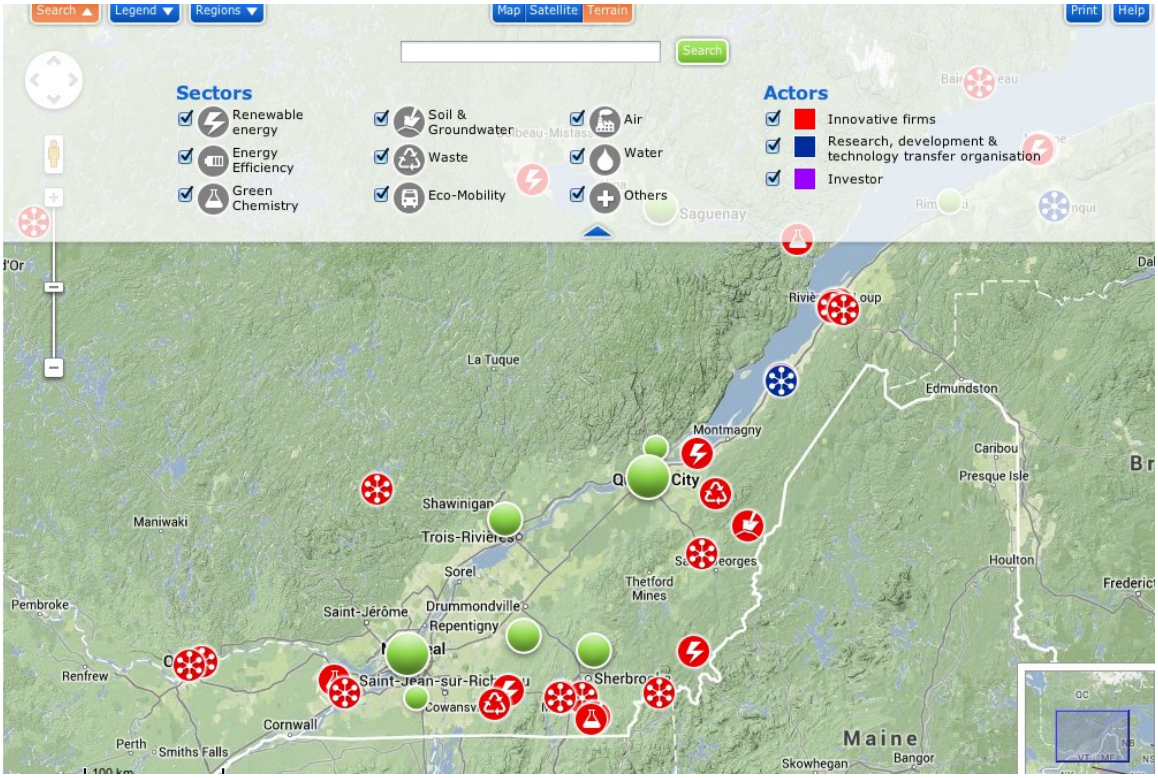
Appendix B



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