Canada’s Net Zero - 440 Megatons of CO2 by 2030: Is a battle between Human System Dynamics and the Political - Economic systems.

by

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Declaration

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Acknowledgments

After so many years of struggle in my life, I am finally completing my lifetime dream of pursuing my MBA degree. Today, I am realizing my dream when writing these final sentences. I am very appreciably delighted at this moment and to take this opportunity to thank you all.

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"Neither the light sea breeze, nor the bright moon light
can shy away from neither the poor and downtrodden nor the rich and privileged"

Virtues of Life and Nature!

Dedication

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I take pride in dedicating this Dissertation to my lovely wife Ashuka, whom I celebrate as the Soul of my Life, my W(L)ife!

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"Know that a Dream deferred is not a Dream denied.
Investing in your job earns you a living only; Investing in yourself,
Earns you the freedom you want"

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Abstract

Canada enjoys a natural resource based economy and therefore a tacit beneficiary signifying the carbon embedded "hockey stick of economic growth" from its' wealth of fossil fuel and mining industries. However, affected by climate change, Canada is determined to mitigate its carbon emissions and thus committed to reduce CO2 emissions by at least 40 per cent below 2005 levels by the end of the decade or to no more than 440 Mt a year in 2030 en route to net zero by 2050.

The research question: What could be the most productive and objective financial incentive program that must be implemented to avoid policy resistance by the general public and, if those incentives potentially spur equitable and tangible returns to citizens and transformation outcomes for Canada's political - economy and the natural environment.

The research intends to answer this question by undertaking a Qualitative primary research via a mailed out survey. A purposive sample of randomly selected households voluntarily respond to the Likert scale rated Questionnaire informing the economic independence of business organization, the inter-dependence of human system dynamics with the natural environment and the impact of political - economic policy mechanisms on society and business. Researcher's bias in designing the questionnaire has been considerably eliminated by requesting the respondents to provide their own comments in writing in a separate section.

Insights from the research reveal an evolving socio-economic dimension augmented by technology advancements. It further emphasized the human relationship to energy efficiency through Affordability, Accessibility, Acceptance and Acquisition and that climate accountability can't be to increase top line business revenue, rather to develop an equitable and sustainable Green economy for the people and nation.

Keywords: energy efficiency, social innovation, universal ownership, systems thinking.

TABLE OF CONTENTS

Chapter One

Canada's Net Zero - 440 Megatons of CO^2 by 2030: Is a battle between Human System Dynamics and the Political - Economic systems.

INTRODUCTION

The Green House Gas (GHG) emissions and the attributed carbon footprint have precipitated a detrimental outcome on society. It is seen as a deliberate action and expediency of corporate businesses, especially of the fossil fuel industry to perpetuate blame on households exchanging transactions at one end of the Free – market; the End - User, using products manufactured from non - renewable natural and synthetic resources for the last 100 years. Business thereto has imposed the market economy's subtle and linear moniker on the people "Consumer" and its ensuing consequences without exemption to what was innovated, developed and marketed to making greater business growth possible, Ackoff, R. (Genius of Outliers 2022). Hence, this unfolds as a contemplation to exorcise the empire of the fossil fuel industry who perpetuate the importance of fossil fuel as the only energy that runs the economic engine in every country; making reference to humans as "Consumers" by pushing aside their generic identity of citizens and people, men and women empowered with a natural endowment fetching "the Natural Investor capacity" when elaborated is their Renewable Human Energy (RHE) composed of innate "Physical Energy, Emotional Energy, Mental Energy and Spiritual Energy", Loehr, J. and Schwartz, T, (2003), Neill, D. (YouTube 2022). The business organizations and its landscape is building profit and wealth at the confluence of injury to human health, environmental decay, deterred economic well - being and inequity in wealth building against an Equal partner and element in the economic system. It is pertinent to note that households are not guilty of buying goods and services and rationally choosing the utility of product options presented in the market as this is mainly orchestrated by commercial enterprise through capitalism (free market) and materialism (also labeled as Consumerism), Wiedenhofer, D. et al. (2018). The primary function of a traditional Market Economy System is creating wealth through (1) generating society's economic capacity and a corresponding consumption capacity by providing employment, (2) utilizing natural capital and its material inputs, (3) adding value with human capital for manufacturing process and management for the throughput of products and services, Ackoff, R

2022. (Genius of Outliers 2022) to generate growth and profit aimed at appeasing shareholders; popularly known as Shareholder primacy in the investment market. In consequence, they dismiss adequate concern for limits of the environment and natural ecosystems. Therefore, an incompatible business attitude of the commercial enterprises since the industrial revolution have largely been injurious to humans, inter-generationally, along "with the use of fossil fuels creating CO2 the largest of emissions", Dubois, G. et al. (2019) that have caused global warming , climate change and its crises. Therefore, Canada has chosen the pathway to a low carbon economy with its annual carbon emissions balanced at 440 Megatons of CO2 by 2050 through Energy transition.

PROBLEM STATEMENT

In confronting the problem, that is better coined as the "realities", of Green House Gas emissions and Climate change are not limited to any particular country or hemisphere. Citizens in every country are in a dilemma, because of the burden of reaching the Net –Zero targets is disproportionately imposed upon them. In Canada, a levy of Carbon tax and Fuel pollution tax as a mechanism for Pricing the Pollution was introduced in 2020. These taxes will be long loathed as an additional tax on the middle and lower income people in Canada. Contrarily, public corporations in Canada, USA and most developed countries have been granted billions of dollars in the form of subsidies and incentives by their government, because they pretend to omnipotence and goodwill at driving a regenerative economy with renewable energy and unrealistic de-carbonization technologies, namely the Carbon Capture Utilization and Storage technology (CCUS).

Any type of business tax in Canada, namely the Carbon tax and the Fuel pollution tax levy collected by corporations to the government for the provision of social goods would not justify the natural environmental damage nor social inequities and psychosocial and economic insecurities suffered by society. These carbon taxes appear to bear defects in its purpose; neither do they act as stimuli to curb carbon emissions at source, because the carbon tax costs are directly passed through to the public at the point of sale causing financial hardship whilst being seen as a regressive tax policy on its citizens, Fremstad, A. et al. (2022)

Theory of Anthropogenic Climate Change means humans are responsible for "climate change by burning fossil fuels such as coal, oil, and natural gas", Dubois, G. et al. (2019). This raises an argument against political and economic policy that exclude actual change makers of the economy; households playing a dual role of producers and consumers in the infinite game of economic development and growth. But, political expediency to portray climate change as sheer business crisis, then exclusively consult, collaborate and incentivize the fossil fuel industry providing with new infrastructure, financial investments, economic returns and solutions largely to business entities equates a divergence from executing the proxy of all citizens. Corporations, especially in the fossil fuel industry are undoubtedly seen as elusive by their business attitude, always demanding a business case for sustainability and further have polarized people with Climate denial campaigns to cost and benefit based carbon mitigation Solutions denial pronouncements; whilst earning all negotiated business incentives attributed to Free markets and Capitalism with their political influence and power.

On the other hand, The federal government of Canada in alignment with its carbon mitigation program and "preferred technologies to transition to low-carbon households", Astudillo, M.F. et al. (2017), has offered nominal instant cash rebates upon the purchase of Battery Electric and Hybrid versions of passenger vehicles in the hope of accelerating its Net –Zero interim target in 2030 and the 2050 target reducing the annual GHG to 440 Metric tons from 2012 baseline. However, new vehicle "Sales data of Battery Electric vehicles (BEV) and Plug in Hybrid electric vehicles (PHEV) for 2023", IEA (2022) show truly disappointing results.

In this backdrop, the common man is seen as a powerless subject when they are confronted with the climate change catastrophes and its consequences on human well being. It must also be noted that "they have already been familiarized and confined to a cost effective, efficient and a reliable source of energy - fossil fuel for their primary needs" for more than 100 years. Changing to a new source of energy at the instruction of government and its policies seem that disorientation is thrust in their planned lives and aspirations. This abounds despite people's natural human agency; power and capacity to make rational choices and decisions in their own self interest, Serrao-Neumann, S., et al.(2023) and hence, a handicap in coping with the emergence of an evolving energy transition for personal transport and an evolving Green economy; ensuing lifestyle, living costs, living standards etc., Bandura, A.(2006).

Hence, the role of government and its policies must be first to recognize the degree of stakeholder relevance of its citizens and their associated significance at implementing the de-carbonization program. A country's citizens are the source and elements of its national economy, but the prospect of their well- being is either wittingly or unwittingly bestowed upon industrial, technological and financial enterprises and their vested interests and initiatives. Thus, government policies have the tendency to implicitly and explicitly relegate the role of citizens to mere consumers who must conform and comply with what the market serves and regulates; even if that is a lesser living standard. In that, an argument is raised denoting the Market Economic System primed on non –renewable energy is obliterate and that a new system based on Life Enrichment and Empowerment must be established to ensure that the Economic System is realistically Life Centered : Life Centered System Thinking (LCST), Benson, E., Sequeira, C. and Fehler, M. (2024) replacing the neo-liberal business centered economic system alluding economic growth by its very definition for what is the economy of a country; this is what any average person who would usually search on Wikipedia or the Retail investors find accessing definitions and descriptions for Economy on Investopedia to economy. They derive a loosely and deficiently formed description: "The economy is the total of all activities related to the production, sale, distribution, exchange, and consumption of limited or scarce resources by a group of people living and operating within it", Investopedia, (2024), Bank of England (2020). Therefore, the prominence of human energy in the economy as a Natural Investor and equal partner, much simplified by the authors, as "Currency of Energy" will be explored in this exercise towards the Life Centered Systems Thinking, Loehr, J. and Schwartz, T, (2003).

RESEARCH GOAL

Accordingly, the overall research goal is to examine how a "Systems Thinking" process, when adopted, in Government Policy decisions would empower citizens' capacity and agency and also enable equitable income and wealth and the overall enrichment of human well – being, in harmony with the natural environment?

RESEARCH QUESTION

What could be the most productive and objective financial incentive program that governments, particularly, in developed countries must implement to avoid policy resistance by "End - user investors" in passenger vehicles (Personal use transportation), which potentially spur equitable and tangible returns to "End user investors" and transformation outcomes for the government and natural environment; collective contribution to an ambitious Net zero interim CO2 target by 2030, in Canada.

Objectives

1. Are the households in Canada inclined to transition by owning and operating an electric vehicle or prioritize on carbon emission reduction in home heating and cooling systems?

2. What do the households think about the incentive - rebate "program offered by the federal government in Canada" towards the purchase of Battery Electric Vehicles (BEV)?

3. How a "Systems Thinking" process would empower people's capacity and the overall enrichment of human well – being, in harmony with the natural environment?

Chapter Two

HOW ACHIEVING NET ZERO IS A BATTLE IN CANADA?

Net- zero carbon emissions

The United Nations founded a "high level expert group on" 31st March 2022, recognizing the significance of environmental integrity and credibility of the "net zero emissions commitments" declared by "non –state entities", UN Expert Group (2022). The objective of that expert group was to deal with gaps prevailing in the net - zero domains and to ensure the required recommendations, guidance, accountability and vigorous implementation. This is aimed at accelerating the de-carbonization commitments made by businesses, investors, financial institutions, cities and regions. Their recommendations were made available to the Secretary General prior to the "UN Climate Conference (COP27) in Sharm el Sheikh", Egypt in 2023.

Canada signed the Paris agreement in "2016 and committed to reducing its green house gas (GHG) emissions by thirty percent" (30%). However, the Paris agreement requested all countries to increase their GHG targets over time. Therefore, "Canada committed to a higherCO2 emissions target of 40-45% below 2005 levels", OAGC (2024) This enhanced target amounts to an annually variable emissions reduction target of 406 to 443 megatons of CO2 equivalent (CO2e), "Office of the Auditor General of Canada", (2024).

Net - Zero means striking a balance between the mechanisms for taking out as many emissions out of the atmosphere as it puts in through human activity and Sequestration - carbon sinks that are forests, oceans and other natural environment that have the natural "ability to absorb carbon dioxide from the atmosphere" , Climate Institute Canada, (2024). In order to achieve the net zero emissions target, Canada must shift "technologies and energy systems that do not produce gas emissions" whilst "removing all remaining emissions from the atmosphere", Climate Institute Canada, (2024) and ensuring permanent storage of the remainder - CO2. Canada is a capitalism driven economy and responsible to lead the task of reducing carbon emissions primarily by the very many privately owned, non- state business entities in the industrial and service sectors despite their voluntary net zero commitments, followed by cities and regions to achieve the net zero targets.

Global Warming

Warmth is a very good feeling that reflects the physical and psychological health of people and their personal and social relationships. A little smile from an unknown person promotes a conversation with them. But, in the recent years an uncontrolled temperature in the natural environment has caused a crisis thrusting human beings, organisms and entire species of biodiversity to an uncomfortable and increased global temperature. At the incidence of this increasing atmospheric temperature in the recent two centuries caused by carbon emissions, solutions were required to mitigate the global temperature increase and to a limit of only 1.5 degrees Celsius. Yet, the global populace is at cross roads with those who are primarily responsible for the creation of uncontrolled carbon emissions owing to the legacy of industrialization, industrial processes and the consequent economic growth that manifest a faltered economy of developed and developing countries, their standard of living and inequality of wealth; the "Climate induced Stressors" in human health and well-being and simultaneous deprivation of the Common good and Dignity of Life. However, people in developed countries are polarized in accepting the claim for climate change versus rejecting its crisis as corporate power dynamics and special interest groups including politicians triumph by disinformation. They challenge scientific information that undermines the measured content of carbon dioxide (CO2) in the atmosphere. This impropriety was demonstrated and widely distributed or shared around the world on social media upon a US Congress committee hearing when Environmental specialists of the US Environmental Protection Agency testified before them. They were almost relegated and ridiculed by Congressmen who juxtaposed the atmospheric carbon dioxide content with a misleading calculation by percentages; it's seen as an expedient move by political partisanship contradicting the systemic unit of measurement for carbon dioxide (CO2): Particles Per Million molecules (ppm),

The Green House Gas (GHG) and its effect

"Greenhouse gases are fundamental to keeping our planet at a suitable temperature for life. Without the natural greenhouse effect, the heat emitted by the Earth would simply pass outwards from the Earth's surface into space and the Earth would have an average temperature of about" minus 20°Celsius making all lives freeze to death**.** The natural heat we receive daily from Sunlight gives warmth to the planet Earth. This solar radiation is the heat energy that the Sun emits constantly on the earth's surface. As shown in Fig. 1 "The **Sun** emits energy in the form of short-wave radiation, which is *weakened in the atmosphere* by the presence of clouds and absorbed by gas molecules or suspended particles"; "after passing through the atmosphere, solar radiation reaches the oceanic and continental land surface and is reflected or absorbed. Finally, the surface returns it to outer space in the form of long-wave radiation," Iberdrola, (2024).

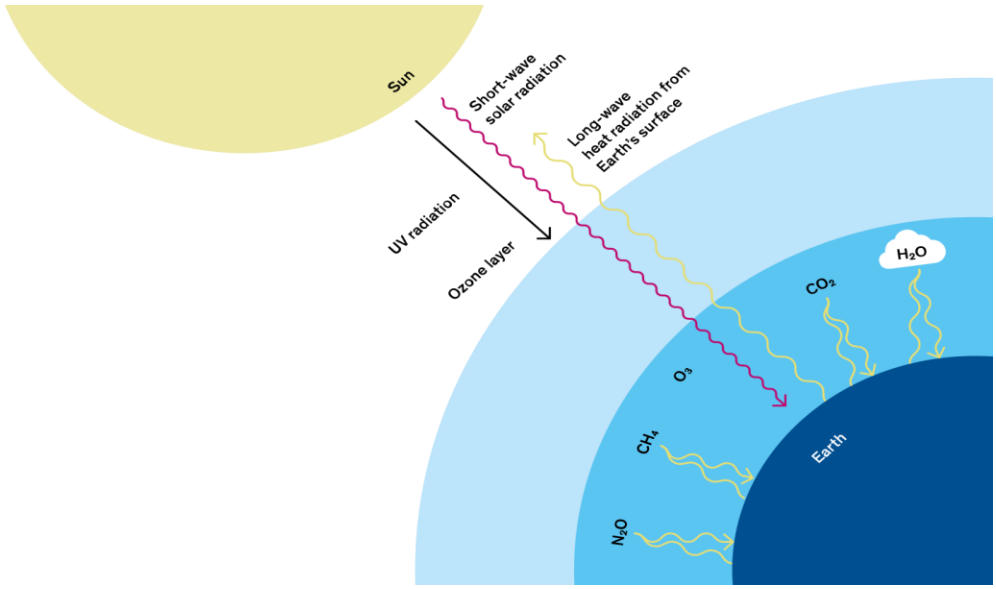


Fig. 1. Source: Adapted from myclimate.org – The Green House Effect

The "Earth's atmosphere is a composite of gases that can be classified"; 1) naturally occurring and 2) Human activities also called anthropogenic activities, Ahima, R.S. (2020). "A greenhouse gas is called so, because it has the ability to trap heat and warm our planet acting like a layer of insulation, my climate (2023). Water vapor (H_2O) is a naturally occurring greenhouse gas and

“this plays a vital role in keeping the Earth’s surface at a habitable temperature of about 15°Celsius (59°F) for humans and other species”, Ahima, R.S., (2020). “Water vapour is water in gaseous instead of liquid form. It can be formed either through a process of evaporation or sublimation”. “Unlike clouds, fog, or mist which are simply suspended particles of liquid water in the air, water vapour itself cannot be seen because it is in gaseous form”, Energy Education (2024).

“Human activities, mainly burning fossil fuels, oil, coal and natural gas”, disrupt and interfere with the planet Earth’s natural greenhouse. An uncontrolled and increasing “level of carbon dioxide (CO_2) in the atmosphere since industrial revolution” beginning in the 18^{th} century has caused climate change, Ahima, R.S., (2020). Therein, concentration of CO_2 in the atmosphere measure as 50% higher than the pre-industrial level that was about 280 ppm or less. “Methane (CH4), “a potent greenhouse gas, is produced from decomposition of landfills, agricultural waste, and ruminant animals”. “Nitrous oxide (N_2O) is produced from fertilizers and burning of fossil fuel and vegetation”. “Excessive levels of carbon dioxide, methane, and nitrous oxide increase the greenhouse effect, trapping heat and causing the Earth’s surface temperature to rise”. “As temperature increases, more water vapor evaporates from the oceans and other water sources into the atmosphere, causing temperature to increase further”. Ahima, R.S., (2020).

Average annual concentration of CO2 is increasing year-on-year. In March 2021 the CO2 level increased to 417 ppm. The increase in CO2 levels are the reason for devastation on the environment, evidently the “extreme weather occurrences such as heat waves, droughts , wildfires, floods, heating up of oceans resulting in” marine habitats disruption, “ocean acidification” and sea level rise, Igini, M. (2023). The Inter-governmental Panel on Climate Change (IPCC) has alarmed in its report that “greenhouse gas emissions” need to crest by the year 2025 for a chance to meet the limit of 1.5 Celsius target. The World Meteorological Organization are concerned that despite pledges from the corporate business and “commitments from governments around the world to limit global warming”, IPCC (2022) there is a potential breach of the 1.5 C threshold by 2030 due in large to the rise in anthropogenic carbon emissions. However, technological advancements in Clean energy by transition to Wind and Solar energy and low carbon fuels, non-use of water for steam *creating water vapour* in oil sands

excavation- "In oil sands mining, hot water is used to separate bitumen from sand and clay and, the largest use of water for oil and gas activities"; "In-situ operations," use water to *generate steam* and to heat the bitumen underground", Canadian Association of Petroleum Producers (2024). Mining and Energy efficiency in manufacturing processes and adequate financial investments can spur "advancements in the clean energy sector"; these "indicate that there is still hope that humanity will change the course before the impacts of global warming become irreversible", Igini, M. (2023). Accordingly, the public must become aware of the correlation of their indoor CO2 pollution in homes and buildings impacted by the vulnerability of CO2 levels in the outdoor.

Global Warming Effects on Human Energy, Inflation and Food Security

Economic productivity of the human being, their health, income and affordability in economic terms are adversely affected by climate change in a multitude of functions, geographic situations and environments and, their pursuit of work - life balance. Empirical studies have improved the understanding of impact on labour productivity, human health, agricultural output and energy demand arising from changing weather conditions, significant temperature differences and precipitation along with affordability and hardships from increasing prices and inflation, Kotz, M.,et al. (2024). Global warming and heat impinge on the health of field and indoor workers. Working outdoors in occupations such as transportation, agriculture, municipal services, utility and construction, these workers are vulnerable to extremities in atmospheric temperature, changing weather and poor air quality including disease carrying pests, EPA (2023). Those working indoors in warehouses, manufacturing and process plants and similar environments encounter inadequate air conditioning and ventilation due to extreme outdoor temperatures. Floods, heat waves, wildfire smoke and storms are other risks that emergency response workers – police officers, paramedics and fire fighters face repeatedly in their committed duty of saving lives, rescue and recovery operations, EPA (2023). Thus, working hours of the scheduled labour supply diminish due "to heat related illnesses such as heat strokes, heat exhaustion and death" in jobs that are physically demanding. Worker performance and productivity is a metric that economists use to calculate investment intensity and efficiencies where "Productivity growth is an opportunity to increase output without increasing inputs and incurring these costs." Therefore,

any non productive hours and lost production time stemming from heat stress, taking time to rehydrate and cool down reduce worker productivity. On the other hand those working in such conditions that require a worker's alertness to job related hazards can increase the incidence of injury or death due to heat related fatigue etc; Dasgupta,S., Van Maanen, N.et al. (2021).

The impact on Canadian agriculture from climate change is not expected to be consistent across Canada nor across seasons. There are opportunities and challenges to production that can trim down farmers' competitiveness, productivity and profitability, Agriculture Canada (2020). Canada's agricultural production is concentrated by regions and the variety of their natural climatic conditions, landscape, water resources and amenities in this high latitude country. As a result of climate change, the increased wet conditions during spring and a much hotter and drier and especially less snow laden winter will be much wet and milder with longer frost free seasons in most parts of Canada. Water resources management and irrigation is emphasized for regions "where moisture deficits are greatest, the "Prairies and the interior of British Columbia", b Agriculture Canada (2020) but also in regions where there has not traditionally been a need to irrigate".

Although the whole of Canada is affected, different regions reveal distinct issues, positive and negative impacts exceptional to their different agricultural landscapes. While the Severity of heat waves, floods and wildfires are frequently experienced in Canada, the Food Supply Cold Chain (FSCC) is largely affected in several ways along with increased costs passed down to the consumers resulting in food inflation; the recently coined term "heatflation" reflects the challenges in food storage, transportation, distribution and shelf life, Kotz, M. et al. (2024). Adequate temperature is required to keep food from spoiling and prevent shortened shelf life, resulting in waste, food loss and food borne illnesses. Food insecurity and rising food prices are concerning when "an estimated 35.5 million metric tons of food in Canada is wasted annually, and 32% of the waste is avoidable". Tarasuk, & St-Germain, (2022). Additionally, wasted food makes up 24% of the composition of landfills. It decomposes there; producing methane; fresh fruits and vegetables rank at the top of the most wasted types of food, Daniel, E., Almond, A. et al. (2024).

Chapter Three

HUMAN DYNAMICS

The Essential role of Human Agency, Capacity and Resilience to adapt to Climate change

At this crucial time of Environmental change and Climate crisis in 2024, it is very encouraging to find that the following three distinct areas 1) Human development, 2) Well - being and 3) Disasters discuss the interplay between 1) Human agency, 2) Capacity, and 3) Resilience to reveal the main "areas of agreement across these three distinct fields in responding to multiple stressors associated with environmental change", Brown & Westaway, (2011).

It further, identifies key "points of contestation and uncertainty"; thus, highlight "the need to consider subjective and relational factors in addition to objective measures of capacity to" understand the interplay "as impulsive and dynamic", Brown & Westaway, (2011). which is distinguishable socially and temporally. Therefore, these findings inform and support differentiation between: 1) coping, 2) adaptation 3) resilience and 4) transformation being responses to environmental risks being the likelihood of suffering a loss and stressors. The Cambridge English dictionary defines the word Stressor as great worry or emotional difficulty.

Agency

People usually understand Human Agency as the power and ability of a person to act on their own and make decisions at free will. Psychological science and Social cognitive theory emphasize on four functions 1) Intentionality, 2) Forward thinking. 3) Self – control and 4) self – evaluation. This means an individual is capable of forming objectives, plans and goals to achieving them in the present and also forecast actions for the future. They also have the ability to secure and protect them during adversity and also examine the results of their own efforts by scrutiny in ensuring their self efficacy and that they are not seen as powerless in their psycho-social interactions and their reciprocal impact of environmental and economic exchanges, Bandura, A. (1982, 1989, 2001, 2006, and 2008). Human agency allows them to act in three ways:1) individually to exercise their power upon what they control, 2) act in proxy where they can influence others who have the knowledge, resources and the means to represent and secure their wants, needs, desires and outcomes and 3) act in an organized and collective manner to

embark upon a larger project, cause or mission bringing, skills, knowledge, material and financial resources extended by government, corporate and non - profit sectors to fostering human development and well being.

Capacity

Human Agency is motivated by an individual's adaptive capacity, basically known as Coping and Adaptation to environmental and climate change. One may clearly recognize that people don't just become submissive and powerless or become victims when encountered with environmental threats, because, "adaptive capacity is defined as the foundation of resilience", Fabricius C., Folke C., Cundill G. and Schultz L. (2007) The Human system is one that spans from an Individual to an entire humankind comprising inter-relationships, interdependence, interactions and inter-connectivity and, hence determines a consensual scope of living standards and how they may flourish in a particular environment and at its extension to varied environments of distinction; for example, Northern and Southern hemispheres, Tropical and Subtropical climates, Nelson D.R., Adger W.N. and Brown K. (2007).

A notable approach, Gallopin, G. (2003) states that adaptive capacity is contingent on tangible materials; emphasizing monetary and natural resources. Further, relevant skills and prospects to action change as second level of tangibles; to change and improve their source of revenue and the resulting lifestyle. There is also an improved version of adaptive capacity held by Smit & Wendel that outline finance, technology and information as determining the adaptive capacity and also where, when and how it is accessible, Brown, K. and Westaway, E.,(2011).These refer to infrastructure, institutions, political support and public policies. Referencing the currently evolving new and ambitious carbon free economic parameters and its specialist knowledge, these can be understood to mean Pro-business or Pro-market, affiliations meaning Business as Usual (BAU) and social networks for Social justice etc.

Examining adaptive capacity from a human development perspective, the attainment of adaptive capacity warrants a systemic understanding similar to understanding the nature of any problem to be solved, meaning if it has been precisely defined with a particular discipline, then one half of the problem is solved, Kettering ,C.(1920-1947). Conversely, if you have a problem statement that is gravely deficient, such a statement can disorient the efforts to solve a problem fraught

with confusion and misinformation, Hernandez, J.G. (2022). "Albert Einstein said that If I were given one hour to save the planet, I would spend 59 minutes defining the problem and one minute resolving it," Speraldin, D.(2012). Developing solutions to a wrong problem is a waste of time, money and the intellectual skills and strengths. It thus reveals the opportunity cost of another project. Therefore, the necessity for and development of a problem statement for such adaptive capacity is contingent on 1) Acknowledgement "of the need to adapt", 2) A conviction "that adaptation is" advantageous and achievable, 3) Keen to assume "adaptation", 4) Necessary "resources" are accessible to perform the process and procedures of adaptation, 5) The Facility, skill and aptitude to organize resources appropriately and 6) The external obstacles, facilitation services and limitations that were considered for a sound implementation; if its constrained by political, social and economic processes at different levels marked by organizational budgets etc., Brown, & Westaway, (2011).

The Influence of communication

The power and control of resources needed for adaptive capacity is enhanced through access to consistent and appropriate delivery of information by the different disciplines, organizations and social networks. A failure of communication occurs in climate change adaptation and capacity when there is a growing division between regionalized economies and communities influenced by businesses goals and political motives; it leads to misinformation and disinformation suffered by potential recipients. Enbridge Canada, natural gas supplier discontinued a rebate program it had jointly implemented with the federal government to household Energy transition; replacing the Air forced Gas furnaces with heat pumps. Government agencies and private sector service providers accountable for the implementation of incentive programs and rebates do fail to coordinate their decision making processes and dissemination of such information through designated channels of communication to interested households in a timely manner. As a result, many households face institutional, technical and financial constraints and uncertainties in resolving their adaptive capacity. **Fig. 2** illustrates "Resilience as a networked set of capacities". "The Four circles represent different areas of capacity", Brown, & Westaway, (2011).

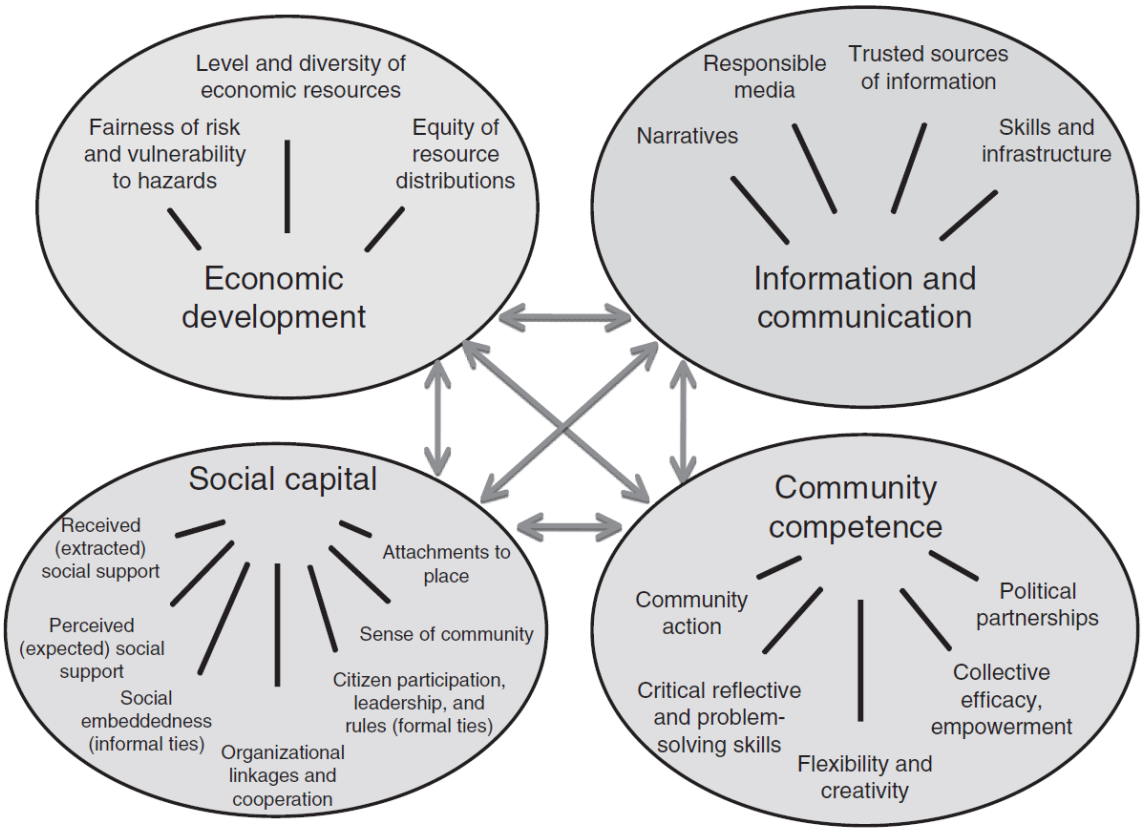


Fig.2. Source: Adapted from Brown & Westaway (2011) Resilience- Network of Capacities

Resilience and Transformation

An individual's psychosocial factors embedded in the role of agency define their state of resilience. This is supported by systems thinking at environmental change, climate change and socio - ecological systems; emphasis is placed on the dynamic and interactive processes, multi-functional and multi-scale characteristics including feedback, thresholds and transitions of resilience in constant performance, Brown, K. and Westaway, E.,(2011).. Although, environmental change and climate change is described as system borne, certain cultures may hold different beliefs and relevance to resilience owing to distinct life values that govern their decision in response to risks, hazards and vulnerabilities. Canada and USA are countries where Individualism and Collectivism are pervasively adhered in every person's life and career goals mostly known as the North American dream they pursue. However, Canada is more of a collectivist culture. Despite this dominance, the corporate culture of US business corporations

and its business culture, generally controlling the Canadian economy owing to its market size in terms of trade relationships with Canada, have an undue advantage in inducing an individualist culture of economics, financial freedom, wealth, prosperity and lifestyle. Thereby it can make a difference in perspectives to systemized resilience and transformation; individual vs. collective and climate science vs. business.

Human Well – being

In the context of human well being it originates a practice of methods and procedures as well as an outcome. It is distinguished by people's everyday companions, where their needs can be met, where they can act expressively and reach goals and also to attaining a reasonable quality of life. As per Sumner 89,well being accounts for 1) "material well being, 2) subjective well being and 3) relational well being" where political- economy has a role to play; such as in inter-generational poverty transmission, but neglected. Lister's taxonomy of Agency is endorsed by Sumner, Brown, & Westaway, (2011).

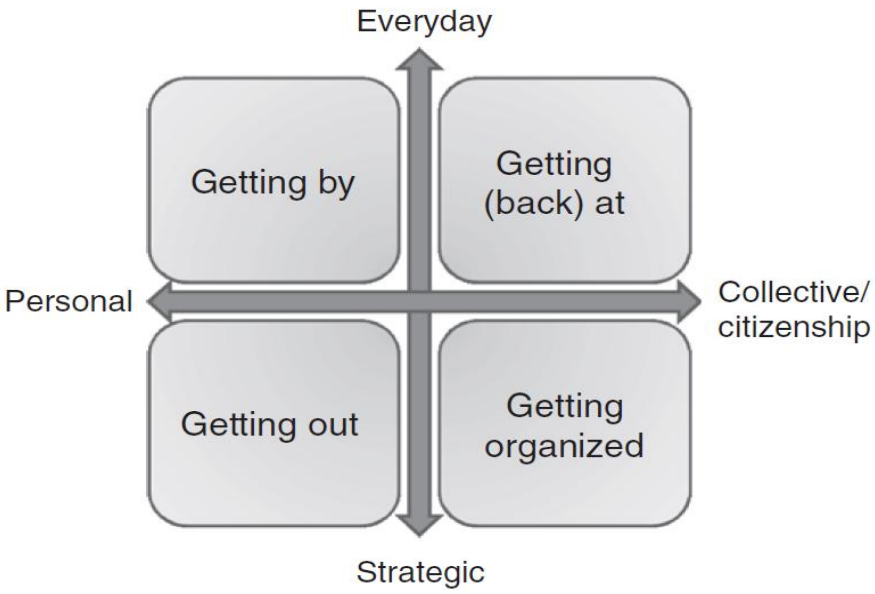


Fig.3 Source: Adapted from Brown & Westaway (2011) A Taxonomy of Agency

This model, **Fig. 3** illustrates the differences between coping, adapting and transitioning in the individual and collective contexts that are warranted responses in resilience and transformation in climate change mitigation and the societal pursuits.

However, Bottrell, D.(2009) informs a contentious notion that conventional resilience theory is quick and eager to render public policies assigning the coping ,capacity adaptation and transformation responsibility incorporating the larger interest of businesses and inputs to the economy and its continual growth more than social well –being. This may unconsciously move the needle "from positive adaptation despite adversity, to positive adaptation to diversity". In that respect, public policy needs to be questioned as to what extent can resilient individuals withstand adversity and arrangements are made for intervention and intended results. It must further be examined to unravel as to who must be "the main agents of change" and the "interchange between structure and agency" and what form and level of resilience and transformation is foreseen; because, resilience and intended transformative change could be met with Resistance to public policy drawing attention to "positioned perspectives, structured inequalities and the distribution of resources for strengthening resilience", Brown, & Westaway, (2011), hence, the acknowledgement and recognition of transformative capacity with immediacy than adaptive capacity enduring "climate change and" the planned "low - carbon economy", Green House Gas emissions (2022).

Chapter Four

WHAT IS POLITICS

Politics determines the well being of people through policies that could become detrimental as much as beneficial. Delving into politics, what the lawmakers can do in parliament, for a better understanding; it reveals that politics can be intrusive, invasive and pervasive beginning with a person's biological system. Given the scale and scope of political play at the world stage, politics is used as a tool and instrument; unfortunately, to conduct mass extinction of human beings or to enforce ceasefire and truce at securing borders and territories between countries by choice as well as save lives in destitute conditions and also victims of catastrophe due upon obligations and imperatives.

The scope of this research is carbon mitigation, adaptation and transition to clean energy. Thus, limit to explore the justifiable application of political obligations and exact policies that can reinforce the goal of no more than 440 Mt of CO_2 a year by 2030 in Canada. However, the controversy and contention is that Carbon mitigation is not seen as a demand or obligation owing to its financial and economic ramifications for the people and businesses, but a moral right and as such policy decisions are challenged within and outside the parliament by special interest groups and a nation divided on political and economic lines.

OIL AND GAS SECTOR GREENHOUSE GAS EMISSIONS, CANADA, 1990 - 2020

"In 2020, the oil and gas sector was the largest source of GHG emissions, accounting for 27% of total national emissions with 179 mega tons of carbon dioxide equivalents, (Mt CO2 eq.) emitted". "In 2020, the sector's GHG emissions were 12% lower than in 2019, the largest decrease since 1990". "In the period from 1990 to 2020, the sector's GHG emissions have increased by 74%", Green House Gas emissions (2022).

Respectively, the economic benefits of the oil sand / tar sands development are gigantic. "Oil is Canada's top export, and the mining and energy sector as a whole accounts for nearly a quarter of Alberta's provincial economy". "The sands pump out more than 3 million barrels of oil per

day, helping make Canada the world's fourth-largest oil producer and the top exporter of crude to the U.S", Plainsman manufacturing, (2018). On the environmental side, this industry needs an enormous amount of energy for heating and treatment in slurry of water and solvents when extracting bitumen from tar sand, In aggregate, "producers consumed 30 percent, in 2018, of all the natural gas burned in Canada", Plainsman manufacturing, (2018). These self incriminating chemical related operations of this industry discharge hazardous chemicals and metals and large volumes of process water are turned into toxic liquid waste tied with carbons, acids and metals. Accordingly, Human System Dynamics summon the inextricable political will and power of governments at all levels to facilitate the necessary changes in collaboration with industry and regional economic factors that determine the human health and safety, the environment, biological diversity and economic prosperity of all individuals in Canada.

DIVISION OF POWER – FEDERAL VS. PROVINCIAL

Environmental protection in Canada has been a "federal – provincial political struggle", Scott, D. (2018) because the Constitution of Canada had not clearly stated nor assigned its responsibility on environment to either provincial legislature or the federal parliament, ENSU Committee Report, (2024). Especially, "the federal division of powers laid out in sections 91 and 92 of the *Constitution Act, 1867* is at the core of Canadian debates and controversies over environmental issues, from litigation through to political struggle", Scott, D. (2018). The federal power on environment is limited to parliamentary jurisdiction over Canada's "seacoast, federally owned lands and property, inland fisheries, Indian and "Indian reserves, navigable waters and shipping, interprovincial and international trade and commerce, the criminal law and the federal Parliament's general power to make laws for the Peace, Order and Good Government of Canada" (POGG), ENSU Committee Report, (2024). Indigenous people's rights over the environment, the autonomy of self government and land claims are an established jurisdiction in addition to the municipal, federal and provincial authorities, Scott, D. (2018). Primarily, the provincial government's authority over "ownership and management of natural resources within their territory - fossil fuel in this context, property and civil rights, local works and undertakings" determine their economy and the social, political, legal dimensions in a shared jurisdiction of the environment law and Eco justice policies of the federal government.

"Human health including the health of vulnerable populations" is a concern for the present and immediate future. In recognizing the duties of the federal government to protect "the environment, the Canadian Environmental Protection Act of 1999" (CEPA) was institutionalized based mainly on the "Precautionary principle"; "which provides that the lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation if there are threats of serious or irreversible damage", CEPA (1999).

The "Greenhouse Gas Pollution Pricing Act"(GPPA) enacted in 2018, recognizes the "Pan-Canadian Framework on Clean Growth and Climate Change and extensively that climate change is a national problem that requires immediate action by all governments in Canada as well as by industry, non-governmental organizations and individual Canadians". The GGPPA, pricing is founded on the "polluter pays" principle, and thus promotes increased energy efficiency, behavioural change and transition to cleaner energy and innovative technologies in renewable energy adopted across all levels of governments, industry and "non –governmental organizations" in Canada "and individual Canadians". It emphasizes on the non-existence "of greenhouse gas emissions pricing in some provinces and that a lack of stringency in some provincial greenhouse gas emissions pricing systems could" sway the national emissions mitigation targets and cause significantly "harmful effects on human health and safety, the environment", biological diversity and on economic prosperity. Therefore, "federal greenhouse gas emissions" (GHG) "pricing scheme" ensures "that provincial greenhouse gas emissions pricing systems" are accounted and that "gas emissions pricing applies" expansively in Canada, GGPPA, (2023)

POLITICAL & ECONOMIC CONFLICT

All provincial and territorial governments have the responsibility to voluntary cooperation in the climate change action, but some economically influential provincial governments, Ontario, Sasketchewan and Alberta showed resistance to the carbon pricing act and its constitutionality; International Carbon Action Partnership (2021). They argued in the Court of Appeal and "the Supreme Court of Canada that the carbon pricing law" and regulation of green house gas (GHG) emissions by the federal government was unconstitutional as the responsibility and authority of this mechanism is constituted in the provincial jurisdictions and heads of power. The Court of

Appeal decisions shed light on the controversy and justification of legal action by each of these provinces: "federal jurisdiction is necessitated by the provinces' inability to address the matter as a whole; through cooperation, which exposes each province to grave harm that it is unable to prevent", and "to enact it as a matter of national concern under the national concern branch of the "peace, order and good government". The Court did delineate that provinces have the liberty "to regulate GHG emissions and can design" and devise "any GHG pricing system they desire as long as they meet the federal government's outcome-based targets", King, R. et al. (2021). Therefore provinces that "fail to establish their own pricing systems that meet the minimum stringency criteria are subject to the federal carbon pollution pricing "backstop" system". "The federal backstop system has two categories", International Carbon Action Partnership (2021).

Canada Pollution Pricing and the Political squabble

The federal pollution pricing system that has been in effect since 2019, beginning at CAD 20 per tCO_2e "in 2019 and increased" annually "by CAD 10 , until it reached CAD 50" per tCO_2e in 2022. However, in 2023, the federal government introduced an enhanced climate plan; "increase the carbon price by $15" every "year starting in" April 2023 and "rise to $170 per tonne of CO_2 equivalent (CO_2e) in 2030",Carbon Pollution Pricing (2023). This change was vehemently opposed by the Conservative party in the parliament during debates and gave rise to these catchy slogans "Axe the tax" and "Spike the hike" messages chanted in public rallies conducted against the increase and touted specifically as a tax on the common people at "a time of" surging "inflation and" increasing "costs of living". On the contrary, 200 Economists in Canada signed an open letter challenging the Conservative Leader's deportment that insisted their party would not be taking advice from the Experts, but they pledge to listen to the "common sense of the common people," Osman, L. (2024).

Increase from 2023 to 2030

Fuel	Unit	Apr.2023	Apr.2024	Apr.2025	Apr.2026	Apr.2027	Apr.2028	Apr.2029	Apr.2030
Gasoline	Liter	0.1431	0.1761	0.2091	0.2422	0.2752	0.3082	0.3412	0.3743

Table 1. Source: Adapted from Government of Canada, Carbon pollution pricing system

Rates of Federal fuel charge on select fuels April 2019 – March 2023

Fuel Type	Unit ($ per liter)	2019-2020 ($20/tonne)	2020-2021 ($30/tonne)	2021-2022 ($40/tonne)	2022-2023 ($50/tonne)
Aviation turbo fuel	liter	0.0498	0.0747	0.0995	0.1244
Gasoline	**liter**	**0.0442**	**0.0663**	**0.0884**	**0.1105**
Light fuel oil (Diesel)	liter	0.0537	0.0805	0.1073	0.1341
Propane	liter	0.031	0.0464	0.0619	0.0774
Marketable natural gas	**cubic meter**	**0.0391**	**0.0587**	**0.0783**	**0.0979**

Table 2. Source: Adapted from Government of Canada. Carbon pollution pricing system

Canadian Carbon Rebate to all Residents

In implementing the Carbon pricing mechanism according to the Emissions reduction plan, the government ensures that affordability is considered in their calculation of impact on the "rural Canadians", recognizing "higher energy needs and more limited access to cleaner transportation options", Canada Carbon Rebate (2024). Thus, beginning "in 2024-25, rural Canadians would receive a 20 per cent top-up to the base Canada Carbon Rebate", Government of Canada (2024).

Annual Canada Carbon Rebate Amounts for 2024-25

	AB	MB	ON	SK	NB	NS	PEI*	NL
First Adult	$900	$600	$560	$752	$380	$412	$440	$596
Rural	*$1,080*	*$720*	*$672*	*$902.40*	*$456*	*$494.40*	*$440*	*$715.20*
Second Adult	$450	$300	$280	$376	$190	$206	$220	$298
Rural	*$540*	*$360*	*$336*	*$451.20*	*$228*	*$247.20*	*$220*	*$357.60*
Each	$225	$150	$140	$188	$95	$103	$110	$149

Child								
Rural	*$270*	*$180*	*$168*	*$225.60*	*$114*	*$123.60*	*$110*	*$178.80*
Family of 4	$1,800	$1,200	$1,120	$1,504	$760	$824	$880	$1,192
Rural	*$2,160*	*$1,440*	*$1,344*	*$1,804.80*	*$912*	*$988.80*	*$880*	*$1,430.40*
* As all residents of Prince Edward Island are eligible for the 20 per cent rural top-up, it is reflected in the base amount for PEI.								

Table 3. Source: Adapted from Government of Canada – Canada Carbon Rebate

Tax payers with more gas use will pay more tax, and get the same rebate as one who uses less, or no gas. It's intended to make gas cost more, to reflect its cost on society. "In provinces where the federal fuel charge applies, most households get more back through the Canada Carbon Rebate than they pay as a result of the federal carbon pollution pricing system, with lower-income households benefiting the most," Government of Canada (2024).

SQUARE PEG IN A ROUND HOLE

In this backdrop, the most important concern Canada is to ensure that its economy is protected by adhering to the Nationally Determined Commitments (NDC) for carbon emissions as it reflects on the global targets and emissions management policies on "Carbon leakage". "The EU has introduced the Carbon Border Adjustment Mechanism (CBAM)" ensuring a fair price is applied to carbon intensive goods for the carbon emitted during the processing and manufacturing of products that enter the EU, Taxation and Customs Union, EU. (2024). 73% of Americans endorse this mechanism to penalize countries they view as Free-riders, when other countries are committed to emissions mitigation and are investing significant financial and political capital to fight climate change, Rythoven, E. (2024) For example, China purchases a lower grade of iron ore from Australia and the steel production from this low grade iron ore is energy intensive. The EU pressures China to reduce steel production emissions and that in turn demands Australia "to green its mining industry or risk losing its most important customer," Rythoven, E. (2024). "The impact" and influence "of the CBAM" is applicable to countries that

trade with the EU. However, the Conservatives have steadfastly vouched that the CBAM would not affect Canada because USA is its largest trade partner exchanging 2/3rds of Canada's transactions and they do not have such a mechanism in place. However, it must be noted that "the United States, under the Biden administration" with bipartisan support has rolled out "the Inflation Reduction Act" in 2023 and, "billions of dollars for Renewable energy, electrification and electric vehicles" to mitigating "climate change" and transition to clean energy, Rythoven, E. (2024). Electoral projections show that the Conservatives are favoured to win by a clear majority in 2025, 338 Canada (2024) and they have promised to roll-back the climate policies and the least cost carbon emissions management "based on the Polluter pays principle"; the Carbon pricing that represents a Carbon rebate for the common people as well. As of this date, a credible climate policy has not been proposed by the Conservatives in opposition and that poses a threat to Canada's future outlook as a developed country, especially a fossil fuel exporter, not committed enough on climate action, but why should Canada benefit from painful costs incurred by other countries on climate action. "Economists remind us, the carbon tax is "the least-cost way to reduce emissions", Rythoven, E. (2024). "Even some carbon opponents agree, such as Saskatchewan Premier Scott Moe who recently revealed that his government considered alternatives to carbon pricing but found them too costly" Rythoven, E. (2024).

Canada should not be thrust to a situation that causes resentment among its allies and trading partners fighting climate change while Canada can free-ride accumulating carbon emissions. Incidentally, USA has imposed heavy tariffs on Chinese raw materials for the renewable energy sector, products and electric cars and this should serve as potential tariff imposed by US governments under different leaders. In fact, President Trump renegotiated and made major changes to the 25 year old, trillion dollar "NAFTA agreement and renamed it; the United States Mexico Canada Agreement (USMCA)". There is no doubt that politicians of other countries will expect Canada to implement robust emission standards and failing which would justify tariffs against Canada's unfair goods. At that juncture, Conservatives will be overwhelmed to submit a credible plan demonstrating the least of costs on industry and common people along with the least impact on inflation and an established record on carbon emissions reduction mechanism; which means reinstating the Carbon tax that they criticized as not mandatory to reaching carbon emission goals for 2030 and 2050, Rythoven, E. (2024).

Chapter Five

SYSTEMS THINKING FOR THE GREEN ECONOMY

Green Economy

"The Green economy" is an evolving phenomenon and to date research on this economy and sustainability has been oriented toward annual GDP growth and its' metrics to assess economic progress of countries. Research articles and literature available are short of encompassing a "systematized economy" that integrates environmental harmony, balancing Personal economy of the public as a whole, equal opportunity to wealth building, human well being and social empowerment that can embody human system dynamics.

Academics and Experts have not been able to provide concrete solutions; plagued by a deficiency of consensus from related disciplines, corporate business and government policy makers. Thus, lend a gap in knowledge and action at establishing an equitable system by policy - makers who were deemed, by proxy and social contract with the public, as the real organizers of markets whereas assertive corporate business organization of "free markets" who, without rhyme or reason, own the system and have created a fossil fuel energy empire that seem formidable.

Accordingly, and in honouring their proxy and social contract with the public and also as the Real Organizers of Markets (ROM), the incumbent Canadian federal government is aggressive on its commitment "to the Paris agreement in" addressing the "climate change" and is very clear about what Canadians want as they proclaim those as a healthy environment, clean air, strong economy and good jobs. "The 2030 Emissions Reduction Plan (ERP)" is a focused action plan to mitigate, adapt and transition to a clean energy environment by reducing green house gas (GHG) emissions along with clean industrial growth and the promotion of sustainable jobs. This ambitious ERP aims at a carbon 'emissions reduction target of 40 percent below 2005 levels by 2030 and net-zero emissions by 2050, Canada 2030 Emissions Reduction Plan (2023)". However, in this research, it is found quite arguably that fossil fuel reached its pinnacle as a commodity centered on naturally sourced energy that drives every economy in the world; meaning "No fuel, No economic growth" and, any absence of fossil fuel hampers human survival

constrained by the magnitude of population, place of living comforts, daily living tasks and delivery of economic activities; in fact, fossil fuels determined the economic growth, increase in population, living standards and life expectancy, McCall, M, (2022). Implicit in this argument is that " oil, gas and coal scored the goals that made possible the GDP hockey stick and that without fossil fuels the 20th-century economic boom could not have taken place and the world might still be stuck with $1.25 a day income averages", Corcoran, T. (2024). Proliferated growth of fossil fuel use has always been supported and reinforced by industrial and consumer affinity to an economical, accessible and affordable source of energy available at a familiar average retail price of $1.50 per liter that apparently is much cheaper than a bottle of mineral water costing in the range of $4- $7 which is also tapped from the ground. The externalities and social costs are very minimal in comparison to fossil fuels – "poignantly a necessary evil" that have an adverse health and environmental impact through its life cycle in the order of upstream, mid - stream and down - stream carbon emissions in their value chain. In review, the research found the need for a systematic thinking process that encapsulates an organized system riveting the advantages and benefits of not being enslaved to economic growth by the fossil fuel industry and their evolving efforts to avoid Accountability for Climate Change.

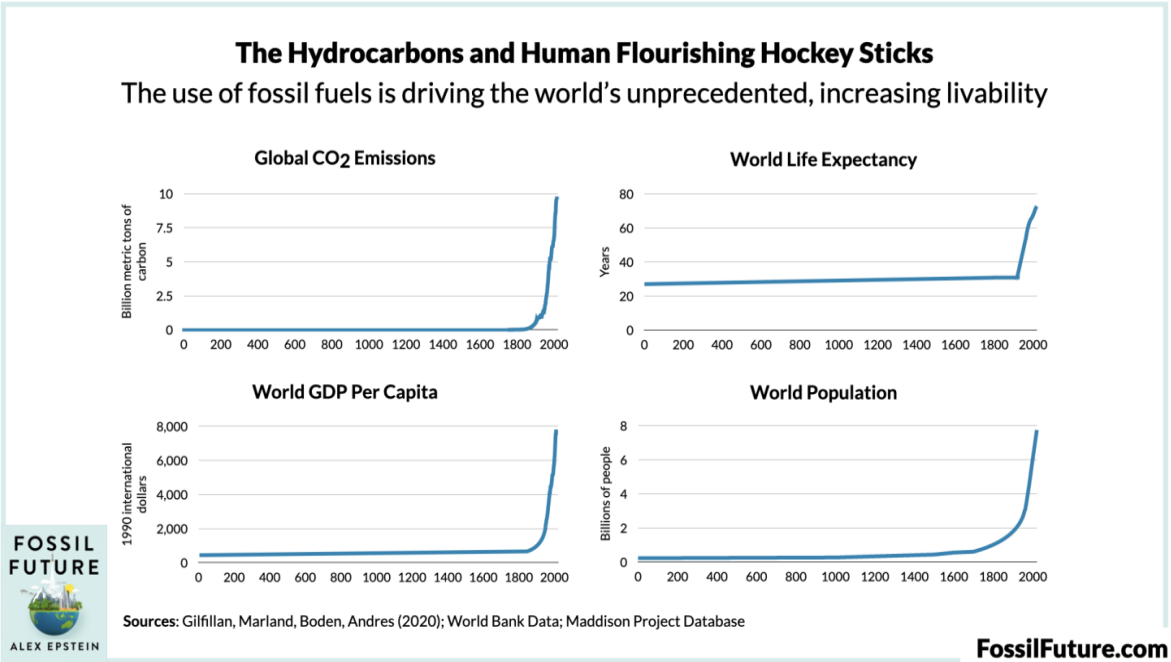


Fig.4. Source: Adapted from Alex Epstein - Hydrocarbons and Human Flourishing "Hockey Sticks"

It means creating an economy decoupled from carbon emissions "requires whole systems thinking", whereas "people who own the system are not encouragingly active, other than to increase shareholder value". "Companies quoted on stock exchanges are worth about $70tn with about half that owned by pension companies", Lovins, H. (2001) and Neranjan, T. (2021). The consequent vulnerabilities of the climate crisis fervently justify the potential Life Centered System Thinking (LCST) for economic growth, generational fairness and controlling externalized costs. An analogy of morality in finding consensus and solutions to the complex climate crisis is merited in the epochal claim of Abraham Lincoln *"You cannot escape the responsibility of tomorrow by evading it today"; thus* enlightens the government of its obligations to the public and a materialistic society dominated by free market forces, "higher authorities in their economic power", that have caused the climate change and chaos.

Hereon, the study is intended to addressing all three objectives of this research:

Are the households in Canada inclined to transition by owning and operating an electric vehicle or prioritize on carbon emission reduction in home heating and cooling systems?

The carbon intensity in homes for their heating comfort during winter and the daily needs of hot water, kitchen and bathroom uses and corresponding utility expenses vary by the types of homes. These range from several detached types, apartment style individually owned units with a common area to Rental buildings and social housing owned by the municipality and Non - profit organizations. Canada's "total residential dwellings reached 16.4 million units in 2021, representing a stock value of $3.3 trillion. Strong growth in housing investment in 2021 drove Canada's net stock of residential assets up 17.6%, representing 21% of national wealth". "The productive activity related to investment in residential housing was associated with over 1.3 million jobs and $141.5 billion in gross domestic product (GDP)", Statistics Canada (2023). This means Canadians are more obsessed with home ownership as their life investment and prospective owners duly saving up their earnings towards a down payment and subsequent payments on the mortgage than choosing to owning and operating an EV at the first instance of an investment opportunity; it is not a necessity unless they want to enthusiastically enjoy the transition to a green vehicle for use despite its depreciable value faster than an ICE vehicle.

Thereto, transitioning to electricity based heating and cooling system is very much prioritized in detached homes. The carbon tax has doubled the cost of using natural gas and in some cases up to $500.00 in some homes where price increases of gas supplied by Enbridge is increased to $10 per Million BTU's - MMBtu; which does not change even after natural gas prices have fallen to 20 year lows of $2 per Million BTU's due to the mild winters resulting from climate change. Yet, households are now paying 500% more plus the government's additional charge of Carbon Taxes at $80/ tonne CO2 (increasing to $170/ tonne by 2030). Incidentally, the HST of 13% is calculated on the aggregate amount of that combined price. The image below of an Enbridge gas bill shows that the household is paying much more for this new Carbon tax $ 31.96, than amount paid $25.22 for their actual gas usage of 233 cubic ft. in the Spring season!

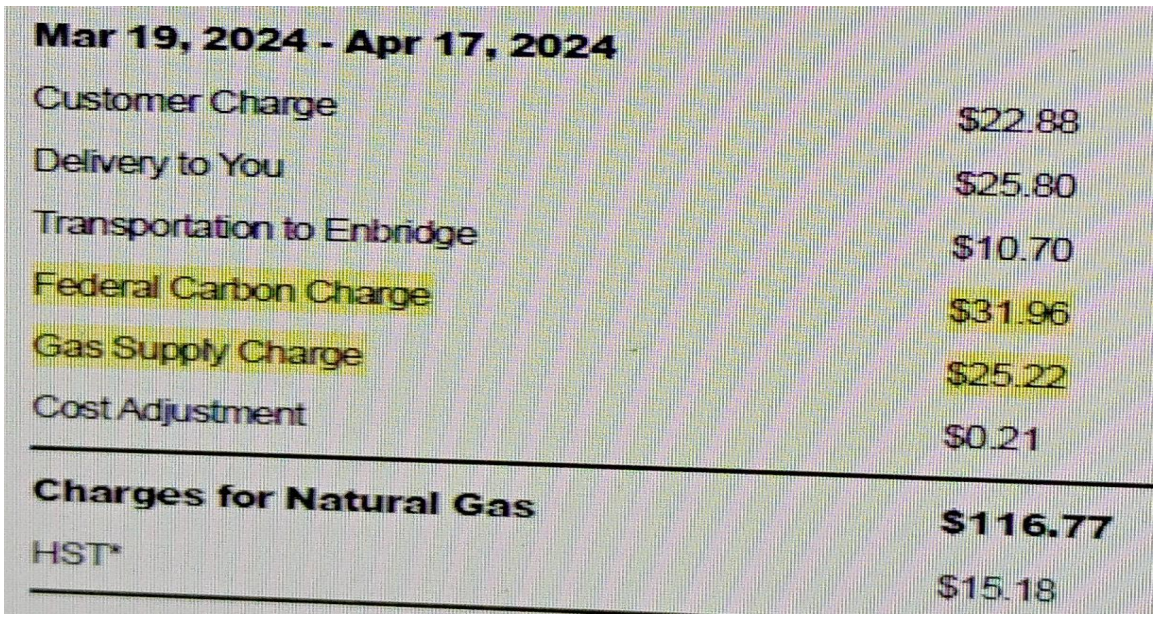


Fig.5. Source: Adapted from a Household's natural gas bill, Ontario, Canada

Converting home heating from natural gas is critical for Canada to meet its carbon emission reduction targets. Accordingly, the federal government has also been offering a carrot: rebates to subsidize green renovations. Hence, contracted Enbridge in 2003 "to run the Greener Homes Program in Ontario, offering two pots of money: $2.6 billion in federal funding and almost $200 million collected from natural gas customers in Ontario that's legally required to be spent on energy efficiency programs "in the province". However, the "federal government's" share of the

funds was depleted two years before schedule, forcing Ottawa to abruptly halt new applications in February 2024. When homeowners apply through the Natural Resources Canada (NRCan) website they were eligible for the federal government's $5,000 share of the grant and missed out on the additional $5,000 from Enbridge because their files weren't transferred to Enbridge before Feb. 5, when the Greener Homes Grant program stopped accepting applications. "There must be thousands more across the province who have been cut off from the Enbridge grant due to a loophole created when the program was transferred from the federal government to Enbridge", Oved, M.C.,(2024). The Ontario government recently reversed the Energy board's decision that terminated the installation and expansion of natural gas use in new residential developments in Ontario; even though methane in natural gas is 27-30 times higher than CO2 in Global Warming Potential (GWP).

This situation validates "Bottrell's" contention about conventional resilience and transformation theory; public policy needs to be questioned as to what extent resilient individuals can withstand adversity and how arrangements are made for intervention and intended results, Bottrell, D. (2009).

What do the households think about the incentive - rebate program offered by the federal government in Canada towards the purchase of Battery Electric Vehicles (BEV)?

Canada is pushing forward to reaching a 100% on Zero Emission Vehicles (ZEV) "sales by 2035 for all new light -duty vehicles, including interim targets of at least 20% by 2026 and at least 60% by 2030, as announced in Canada's 2030 Emissions Reduction Plan", Transport Canada (2024). This means that Canada needs to import quality Chinese EVs manufactured to Canadian standards in order to achieve this target. In the meantime, as of May 2024, US has quadrupled the tariff on imported Chinese EVs and a range of raw materials needed for the clean energy products manufacturing including solar panels and batteries for which the hiked tariffs range from 25-50%. Professor Ian Lee, citing an IEA report, says that China has 60% of the global EV market and tailwinds that enable high stakes manufacturing for export markets; in the face of sizeable market penetration in Europe of Chinese EVs and a foothold already in the province of Quebec, Canada, mostly taxis, may encourage Canada to be indifferent to the effects of US tariff hikes as it affects their own industry protection and presumed national security; EV's

designed with data collector devices where USA alleges such intelligence is destined for the Chinese government's political interests. Regardless, Canadian policy decision should be in favour of Chinese imports "to meet Canada's" aggressive "zero emission targets", or else the targets should be altered and lose the necessary acceleration of EV adoption by the mainstream market. Canada is determined to electrify the transportation industry and these cheap prices would electrify the passenger vehicles sector, excitedly and quickly. Canadian buyers should not be denied of the opportunity to investing in EVs at an ex – works, China, price of $ 15,000 or even at a home delivered price of under $ 30,000 than buying a Tesla for $50,000+. China has already found a loophole through manufacturing investments in Mexico, vicariously benefitting from the trilateral NAFTA trade agreement to avoid heavy tariffs imposed on products of Chinese origin exported to USA and Canada (formerly NAFTA) - USMCA (2019). Chinese innovation in EV technology, access to raw materials, critical minerals, labour costs and car prices are remarkably competitive than USA and Canada, hence the quadrupled hike in tariffs to protect American manufacturing. Thus, Canadians will be paying a higher price for the products to attaining emissions targets by zero emission vehicles if Canada decides to track along USA, especially for solar panels and EV cars and batteries where China controls almost 80% of world's EV battery supply chain. Nonetheless, Canada must weigh its trade-off to achieving its climate goals.

On the other hand in addition to the federal rebate of $5000.00, the provinces of Quebec and British Columbia have offered a provincial EV rebate. No other provinces and territories offer a provincial rebate for purchase of an EV. Regrettably, Ontario being home to the largest population, almost 16 million of the total 41 million in Canada as well as the biggest economy, where the big three legendary car manufactures, Ford, GM and Stellantis and additionally Honda and Toyota factories are located, has failed to promote EV sales or a rebate to stimulate such sales to meeting the target. In the meantime, Canada's new technological investments creating an EV battery supply chain, using its own wealth of critical minerals, will not be ready for the next five years in Ontario and, seem much more detrimental; because major North American car manufacturers have scaled down their investment in new technology and production of Electric vehicles manifesting Canada's vulnerability and lack of innovation and

competitiveness of the big three car manufacturers in the EV market; unabashedly, they prioritize the sale of all gasoline operated vehicles that reap high profits.

How a "Systems Thinking" process would empower peoples' capacity and the overall enrichment of human well – being in harmony with the natural environment?

A Life Centered System is very much different from a business system that operates with self interest for creating profit in a siloed forethought and monetary perspectives of cost – benefit analysis and comparisons. Conversely, Life Centered System Thinking (LCST) is contingent on the intensity of human development availing human agency and adaptive capacity to integrate and organize the phenomenon of human well –being reflecting their equipped or potential resilience and transformation at events and experiences of disasters, natural risks, economic losses and multiple stressors. Accordingly, as Gallopin stated in this study, Human dynamics that manifest the Adaptive capacity of people is dependent on their monetary and natural resource advantages as tangible materials and relevant skills and prospects to action change as the next level of tangibles; enabling them to change and improve their source of revenue and evolving lifestyle. This seems the reason for individuals and sections of people, business interest groups and political entities who enjoy economic benefits, illustrated in the table below, whilst are the first level victims of the effects, affects and impact of climate change, such as wildfire, floods and heat wave, particularly in the western provinces of Canada.

"Alberta's economy is based on hydrocarbons" and petroleum industries "and provides 70% of the oil and natural gas" produced "in Canada", Wikipedia, (2024) who still disregard such stressors; argue, resist and rally against climate mitigation, adaptation and transition plans obstructing the federal government. They cite and frame the communication of Canada's contribution to global warming as a minute 1.5% only; it's rather unfortunate and equates the age old parable of "the blind men and an elephant" that could obliterate the coveted Totality of truth, Wikipedia, (2024).

"Canada ranked as the 11th largest GHG emitting country/region in 2020"; "Canada's share of global emissions decreased from 1.8% in 2005 to 1.5% (687 Mt CO2) in 2020", Government of Canada (2023) which coincides with the rapid increase in economic development in Asian countries. But, obscure Canada's higher "per capita greenhouse gas emissions for the top" 20

emitters in 2022 prevailing at 18.1 tCO2e, USA 19.0 tCO2e and China 10.1 tCO2e respectively, Paddison & Choi,(2024). This must awaken everyone to the realities in Canada and the world that human well - being is first an individual realization, "per capita" , than a country as a whole as it's so witnessed and validated by public ranking of businesses and billionaires.

Province or Territory	GDP (million CAD, 2022)	Share of national GDP (%, 2022)	Population (July 1, 2022)	GDP per capita (CAD, 2022)	Carbon emissions (Million) MtCO2e	Three largest sources of Elecricity generation - Provinces and Territories - percentage				
ECONOMIC FACTORS OF INFLUENCE					2021	Hydro	Natural Gas	Nuclear	Wind	Solar
Canada	2,813,289	100	38,939,056	72,249	679.1					
Alberta	459,288	16.33	4,510,891	101,818	256.1	5	60	Coal = 8	20	6
British Columbia	395,215	14.05	5,356,284	73,785	59.4	87.8	4	N/A	2.6	N/A
Manitoba	86,531	3.08	1,413,409	61,221	20.7	97	1		3	N/A
Newfoundland and Labrador	40,720	1.45	531,583	76,601	8.3	96	0.6	Petlm=3	0.4	N/A
New Brunswick	44,501	1.58	809,568	54,969	11.9	21.8	14.9	37.6	6.9	Coal =13
Northwest Territories	5,574	0.2	44,685	124,740	11.3	47	14	Petlm=37	2	N/A
Nova Scotia	54,383	1.93	1,025,445	53,034	14.6	10	22	Coal=52	11	Petlm=2
Nunavut	4,753	0.17	40,485	117,402	N/A	N/A	N/A	N/A	N/A	N/A
Ontario	1,048,258	37.26	15,145,006	69,215	150.6	25	10.2	51	9.9	2.5
Prince Edward Island	9,376	0.33	167,188	56,081	1.6	0	0	Petlm=0.5	99	N/A
Quebec	545,594	19.39	8,672,185	62,913	77.5	94	N/A	N/A	5	N/A
Saskatchewan	114,412	4.07	1,178,422	97,089	67.1	11	37	Coal = 37	9	N/A
Yukon	3,930	0.14	43,905	89,511	N/A	80	20	N/A	N/A	N/A

Table 4. Author: Troy Neranjan- adapted from Statistics Canada, Canada Energy Regulator and Energy Rates.ca

However, Canadian government through its social contract with the public is determined to ensure that carbon mitigation laws are enacted implemented and regulated to meeting its goal of reducing 40% carbon emissions from 2015 "levels by 2030 and reaching net zero by 2050" despite the political squabble "at the federal and provincial levels". As per Bottrell, (2009), their revelation is that conventional resilience theory is quick and eager to render public policies assigning the coping capacity, adaptation and transformation responsibility that which incorporate the larger interest of businesses and inputs to the economy and its continual growth than empowering social well – being. This clarifies the umpteen numbers and value of subsidies,

tax credits and incentives granted by the federal government from tax payers' funds and the treasury in addition to provincial tax granted to the Oil and gas industry to entice compliance with the enacted laws especially POGG, GGPPA, and the Carbon cap. Yet the fossil fuel industry remains incongruent and resort to delaying tactics envisaging a change in government by 2025 that assures the tenets of business –as- usual (BAU) and establishing their most preferred carbon tax of only $50/ tonne of CO2 emissions levied for all industries, perpetually.

Decouple, Recouple & Rebalance

According to Thales Texeira, in the face of business disruption organizations strategically recouple and rebalance their business mission with agility, Teixeira and Jamieson (2014). Hence lobbying with the government to protect their business interests seeking subsidies, capital investment tax credit of 50% approved this month for Carbon Capture Use and Storage (CCUS) circumventing the emissions intensity and, price difference contracts for carbon credits and 'Emissions cap" imposed "on the oil and gas" industry, Government of Canada, Oil and gas emissions cap(2023).

"The government", besides the mitigation measures they rolled out, they enthusiastically considered the economic benefits of investing a $4.7 billion to purchase the Trans Mountain Expansion pipeline (TMX), later completion costs ballooned to 34 billion, to ensure that Canadian oil natural resources seek export opportunities to other markets and yield market prices than enduring discounted prices by restricting its supply to the presently glutted American Mid-West, generally discounting an average of $15 against market price, currently at $80.00. The division of powers under the federal constitution between provinces, particularly Alberta and British Columbia where the1000Km long pipeline is connected to the port facilities was instrumental in the government's intervention and acquisition amidst allegations by the investor community of nationalization of the energy sector economy. However, the government was determined that the billions of dollars of new income from the TMX operations, Tolls estimated at 2.3 billion, in addition to jobs created during construction, supply chains and operation to corporate, personal income and sales taxes, over the first 20 years per one scenario other than the

TMX lifetime of 60 years, could be invested in renewable energy projects across Canada through redistribution among provinces on per capita basis.

Likewise, for the common public, the Government assures that 80 percent of the middle to low income people receives the "carbon tax rebate" every quarter. But, people generally retort the idea of paying a carbon emissions tax imputed to human activity driven climate change which has been politicized and widely disseminated in the media. This is also a result of regional cultures of individualism as opposed to collectivism described in human dynamics; the EU is a collectivist model for example. Loss aversion is a psychological motivation for persons of any class and thus disregards the carbon tax returned by the federal government to residents; it is judged as a counteracting consumer behavior to the concept of $1.00 saved is a $1.00 earned and being compelled to pay the carbon tax while "Canada subsidized the fossil fuel industry to the tune of almost $60 billion in 2015, approximately $1,650 per Canadian". The burning "of fossil fuels is responsible for annual health related costs of" $ 53.5 billion in Canada, Buchanan (2019). and "the cost of fossil fuel production site clean-up" in "Alberta's oil patch including the 90,000 abandoned oil wells, toxic tailing ponds and ageing pipelines" is estimated to "cost up to CAD 260 billion, De Souza et al., (2018)".

Resilience and Transformation

An individual's psychosocial factors embedded in their role of agency and adaptive capacity defines their state of resilience. This is supported by "Life Centered Systems Thinking" applied to environmental change, climate change and socio - ecological systems; emphasis is placed on the dynamic and interactive processes, multi-functional and multi-scale characteristics including feedback, thresholds and transitions of resilience in constant performance, Brown, K. and Westaway, E.,(2011).

When examining the responsibility of the government in their role as "the main agents of change" and the interchange "between structure and agency and" what form and level of resilience and transformation is foreseen, households face institutional, technical and financial constraints and uncertainties in resolving their adaptive capacity. Resilience and intended transformative change could be met with Resistance to public policy drawing attention to

"positioned perspectives, structured inequalities and the distribution of resources for strengthening resilience", Brown, K. and Westaway, E.,(2011). The tax credits, subsidies and incentive offered to the industry may be frustrating as such a business attitude does stifle the transition away from fossil fuel in Canada. A siloed approach in transitioning to a green economy is prevalent in the few provinces that are resource rich and impose socio -economic sentiments to garner sympathy and overall nationwide resentment and resistance to a low- carbon economic solution and therefore questions the "believability" of the intended transition.

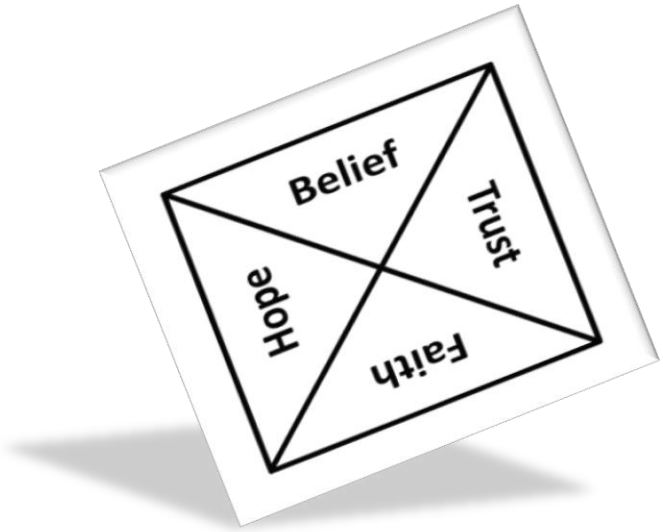


Fig.6. Source: Adapted from Four folds psychology – Equivalent Exchange

Despite any frustration, perceptions are that "all hope is not lost". It is expected that energy transition "decisions made today will" form and "shape the" potential and prosperity "of Canada's energy sector". That is, at the confluence of plummeting emissions from renewable projects globally and less demand for "fossil fuels, clean energy jobs are" estimated "to grow at 7% a year, from 509,000 in 2025 to 2.7 million in a net-zero 2050"; an impending reality, Clean Energy Canada, (2023). The study further finds that "an inflation-adjusted GDP of the clean energy sector would increase to become six times larger in a net-zero 2050 compared to 2025, while the GDP of fossil fuels would" be 50% less", driven by "the federal government's 2030

Emissions Reduction Plan" and Canada's carbon pollution pricing mechanism. However, if a future government decides to reverse these plans, " there would be 100,000 fewer total energy jobs by 2050", Clean Energy Canada, (2023). Therefore, people of nation Canada could be encouraged to "trust" the incumbent government's conviction and commitment to transition to a Green economy by seeking and seizing opportunities at engaging their Natural Investor Capacity (NIC); skills, credentials and upward mobility, in a multi disciplinary sector spanning carbon reduction to renewable energy generation to owning the system of a new green economy and confidently breaking the rules of the legacy ownership of non- renewable energy. It's an auspicious era that can help them emerge as winners at taking a share and equity in growing their income, wealth and human well being in the near future. Herein, the tripartite battle for Net-Zero in Canada may flourish the lives of Canadians, very competitively.

Chapter Six

RESEARCH METHODOLOGY

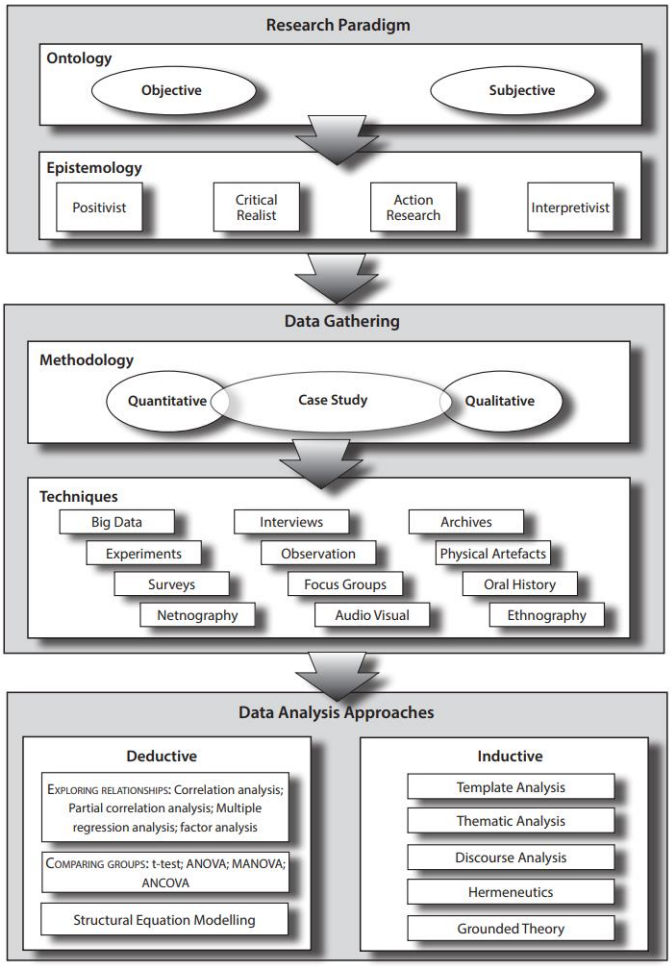
This research project's goal is to examine how a "System Thinking" process, when adopted, in Government Policy decisions would empower citizens' capacity and agency and also enable equitable income and wealth and the overall enrichment of human well – being, in harmony with the natural environment and the evolving green economy through Energy transition. A research paradigm explicates the relationship among Ontology, Epistemology, Methodology and Methods and techniques to understanding assumptions made of the nature of reality and then inquiring how we know and how the knowledge is acquired. Accordingly, the research question and objectives are intended to find out social perspectives, opinions and attitudes that are subjective experiences than objective observations independent of human beings. Hence, the research paradigm selected begins with subjective ontology.

Fig.7. Source: Adapted from Tik Tok – Nature of reality – Taxi Ride!

In subjective ontology, there are multiple realities and those realities are influenced by concept and context. If not, the reality does not exist as they are invariably built on a certain context; economical, geographical, cultural or religious contexts for example. All assumptions, perceptions and facilitations of the reality exemplify a distortion through the lens of literacy,

natural capacity, culture, power, individual and collective interests etc. which, inductively, determine the human interpretation of the unknown phenomena, Easterby - Smith et al., (2018).

The study adopts the methods map for the research design devised by Macintosh & O'Gorman (2015, p.51).



1. The social phenomena falls into the subjective ontology focusing on anthropogenic climate change.

2. The epistemological view follows an interpretive approach allowing for inductive approaches in this case, thematic analysis for deeper interpretation.

3. The paradigm selected is qualitative

Fig. 8. Source: Macintosh & O'Gorman Method Map (extracted from p.51)

The methods chosen for this research makes use of both primary and secondary research methodologies. The secondary research method for this study is literature review and this secondary research, in addition utilized rolling new information, from the media, journals and experts, recognizing the evolution of a nascent Green economy and its new technologies, business practices and government policies treated as primary data relevant to the research on climate change, sustainability technologies, systems and responsible investment. A Qualitative,

primary research was undertaken via a Questionnaire to study the economic independence of business organization, the inter-dependence of human system dynamics with the natural environment, business organization and the national political economy.
This study first reviewed the theory of anthropogenic climate change and the various types of constraints in carbon emission reduction and their characteristics.

The province of Ontario in Canada consist the largest population and highest annual income earners, especially "in the Greater Toronto Area (GTA)". Therefore, a sample of 100 respondents was randomly selected from 10 postal code areas in the GTA. Statistics Canada publishes household income by postal codes. This would help in selecting households by address only, earning an annual income above $80,000 per year and who are mostly professionals. The sample selection was limited to Houses – Single family homes, no Condominiums or Apartments. Following the choice of methodological paradigms a Qualitative research was undertaken via a Likert scale Survey Questionnaire, Dubey, S. (2024) suitable for analyzing social perspectives, opinions and attitudes, consisting 18 questions, mailed to the selected sample with a turn - around time of 15 days. The sampling approach considered participants who have knowledge of the phenomena and in this case purposive sampling was adopted, Nyimbili & Nyimbili, (2022) for this qualitative method.

Research Ethics

The package mailed out was not addressed to an identifiable person or name, except the address was randomly selected. It was addressed as "Homeowner/Chief Occupant". Any attempt for personal interviews or any other form of personal contact with a respondent was totally eliminated. Respondent answers received were tabulated and summarized to arrive at conclusions and recommendations. All returns and responses are considered anonymous wherein the survey questionnaire does not retain a place or field for any type of identification of the respondent, i.e. an identifiable name, addresses, postcodes, faxes, emails or telephone numbers of the household. They are considered voluntary respondents to the survey. The initial package mailed to households was enclosed with a self addressed stamped envelope with only the

Researcher's name. A short introductory letter describing the origin and purpose of this research / survey were included in the package.

Research Bias

Researcher's bias in designing the questionnaire has been considerably eliminated by requesting the respondents to provide their own comments in writing in a separate section after the 18 questions. This allowed the collection of the respondent's own perspectives; an opportunity beyond their answers to the Likert scale items has enriched and balanced the survey responses. All questionnaire responses followed the "Thematic Analysis" approach as per "the steps outlined by Braun & Clarke (2006)". The questionnaire responses were analyzed to group similar contextualised responses, referred to as 'Codes' and the quotes under that code allow a theme to emerge, often called 'in vivo' coding method. This allowed for a meaningful analysis and interpretation of the responses.

Chapter Seven

ANALYSIS AND DISCUSSION

A total of 18 responses were received. Each participant's choice is tabulated adhering to the corresponding six point Likert scale "strength of agreement to each statement" that were designed as a question and shown as a Likert item. Subsequently were grouped to form codes and related percentages as shown below. Additional written information received in the form of comments is enrichment to this inductive interpretation as it can illuminate the narrative and realities of the social perspectives, commitments, concerns and direction to Life Centered System Thinking, Benson et al. (2022) for the coveted Green economy.

Analysis of responses to Likert scale questionnaire for a Thematic analysis

Likert Items	Questionnairre	Clustered Code/ Interpretation	Strongly disagree	Disagree	Slightly disagree	Agree	Strongly agree	Do not wish to answer
1	Q1 - Q3	Awareness of climate change, impact of carbon emissions				54%	46%	
2	Q4-Q6	Electric vehicles for transport and the compulsion of Renewable energy accessibility			20%	61%	17%	2%
3	Q7-Q9	Mitigate and Adapt to Low - carbon industries		4%	22%	54%	20%	
4	Q10 -Q11	Build Resilient infrastructure with appropriate technology			3%	22%	72%	3%
5	Q12	Public private partnership in the ownership of renewable energy assets				6%	94%	
6	Q13 - Q15	Decouple emissions from economic growth		6%	13%	65%		
7	Q16-Q18	Affordability, tax deductible investment in EV, Heating and cooling and good customers					100%	

Table 5. Author: Troy Neranjan, Interpretation of Survey responses

Respondent commentaries have been integrated to shape, refine and finalizing themes, analysis and discussion pertaining to the following three objectives of the research. There were also 3

elaborate commentaries received that reflect a burst of energy, perceptibly surging from the participants' evolution of thinking in a unique and once- in - a life time opportunity to defy oil and gas carbon emissions and transition to a green economy that can become an intergenerational endowment. Therefore, the findings from this survey have progressed to an Abductive Thematic Aanalysis; "abductive analysis is an approach and a process that is exploratory, creative, speculative, and about inference", Rinehart, K. (2021). Those commentaries merit independent recognition for describing their Dynamic resonance – "Dynamic resonance is often expressed through parallelism and/or analogy", Tantucci & Wang, (2022).

Are the households in Canada inclined to transition by owning and operating an electric vehicle or prioritize on carbon emission reduction in home heating and cooling systems?

Clustered interpretation	Dynamic resonance	Theme
Awareness of climate change, impact of carbon emissions	Heat pumps are not effective on the Prairies in the Winter because we drop below their operating temperatures. But they work fine in the east. No one solution for everything.	
Affordability, tax deductible investment in EV, Heating and cooling and good customers	Fossil fuel apologists don't agree with Per capita energy consumption shows exactly what people in each country are consuming. They don't like that because it shows how wasteful we are.	Transition to owning and operating an Electric vehicle or prioritize on carbon emission reduction in home heating and cooling systems.
	Gas prices still haven't come down, because it turns out the Carbon Taxes had nothing to do with increased prices.	
	Oil companies got caught, once again, spreading false information about climate change through their mouthpieces at Pathways Alliance.	
	All these transitions still saw the former source increase even as the latter source also increased. We burn more coal today globally than in any other time on history. Same with oil and natural gas.	

Table 6. Author: Troy Neranjan, Abductive Analysis Theme ONE

Participants show remarkable awareness and understanding "of the climate change", its impact "and the carbon emissions" – 54% agree and 46% strongly agree. Evidently, they are much aware of the human influence on climate as a consequence of carbon emissions; the intensity of heat waves, extended drought season, wild fire intensity, milder winter months, floods and the mounting financial burden on their home insurance premiums, municipal rates, utility charges and increased food prices from supply chain disruption, crop failures etc. These challenges test their adaptive capacity and resiliency. Clearly, Affordability is at the heart of their propensity to transition to resilient living in the face of climate crisis demanding a change in consumer and

social behavior. The commentaries provide a great insight into their focus on adaptation while projecting their barriers. Addressing the issue of heating and cooling, this research found that "there is no "Right to Cooling" law in Canada", Guertin, Pelai et al. (2023). Under the Residential Tenancies Act, air conditioning is not considered a vital service except heating and the temperature must be maintained at a minimum of 20 degrees Celsius during fall, winter and spring. The summer heat, except in this era of climate change has always been a luxury in this part of the cold northern hemisphere for outdoor recreation, tours and travel. But, new changes in the building code are needed to facilitate adaptation and resilience.

Again, for their concern on heat pumps - these are not effective on the Prairies in the winter because those provinces drop below their operating temperatures. But they work fine in the Eastern provinces. However, as stated in this research earlier, scandalous business practices have influenced the provincial government of Ontario overruling the Ontario Energy Board's (OEB) decision where the OEB ordered Enbridge Gas is prohibited from "passing down the costs of new natural gas connections to homeowners on their bills" starting January 2025 and that developers must pay costs in full and upfront. Because, OEB was concerned that climate change has effected an energy transition from heat trapping methane borne natural gas and its risk of becoming socially unacceptable, uneconomical and a stranded asset against increasing low emission energy sources, distributive systems, continuous quality and cost improvements, Syed. F. (2024).This acknowledges Enbridge's business strategy to enforce a raft of charges on homeowner's gas bill, **Fig.8**, even when households install a heat pump but asked to retain the gas connection as a standby; professionally recommended on Enbridge website and communication channels.

There isn't a one solution that fits all, its' a practical challenge in Heat pump uptake for heating and cooling when adoption is triggered by regional temperature variances and the dominance of any particular energy source in their energy mix. Alberta's electricity is generated by 80% of natural gas and it's the cheapest but, not clean energy. This is apart from the structural barriers at benefitting from rebates and incentives under the federal greener homes program, restricted access to owner occupied single detached homes than inclusion of condominium owners, renters and landlords Guertin, Pelai et al.(2023). Nonetheless, survey findings show a resounding 100% agreement to a fully tax deductible program that households would adopt in owning a resilient

technology for heating and cooling in their place to live, thus align with the research about homeowners' desire to enhance the value of their lifetime investment and climate adaptation.

Participants are concerned about the Per capita carbon intensity and why emissions from the recently enhanced exports of oil, gas and coal from Canada are not accounted and if those carbon emissions entail the fossil fuel carbon tax. This is particularly intriguing because the public as a whole is sharing the burden of an incremental carbon tax levied up to year 2030 despite receiving carbon rebates; an incentive not appreciated by the people as identified in this research.
On the other hand, the sentiment that Gasoline prices still haven't come down is because it turns out the Carbon Taxes had nothing to do with increased prices but crude oil price volatility and uncertainty posed by world political – economic events and demand fluctuations engineered by the oil cartel. For Canada, although it produces and exports crude oil, the price of consumer Gasoline is dependent on the bulk of crude oil that must use refineries in United States for refining and processing. Thereby, prices are determined by the exporter to Canada.

But, people tend to think that producers could increase their export production and profit by merely paying the carbon tax. Saliently, the federal government had sanctioned the Methane emissions regulations to cap the fugitive emissions; flaring and venting of natural gas and also made changes "to the Competition Act "that target "greenwashing" (i.e., making untested or unsubstantiated claims about the environmental benefits of a product or business)", Blakes (2024). This confronts oil and gas companies' unsubstantiated claims of delivering clean energy and carbon capture mechanisms. In the meantime, any initiative to eliminate carbon tax from natural gas heating would deter reaching emission targets. Incidentally, a few provinces thrive on speculated economic chaos by energy transition and yet exploit that position to further expand by luring new investors taking advantage of the cheap electricity generated by natural gas, coal etc, **Fig.9.** The irony is that "despite rapid growth in the new source, use of the older energy source continued to grow," York & Bell, (2019), the new Liquid Natural Gas pipeline investment by a private company, project value $18 billion, for export to Asia, for example, Pastor et al. (2022).

What do the households think about the incentive program offered by the federal government in Canada towa rds the purchase of Battery Electric Vehicles (BEV)?

Clustered interpretation	Dynamic resonance	Theme
Electric vehicles for transport and the compulsion of Renewable energy accessibility	Bottom line is what do you support? Our Economy and jobs, or the crazy dreams of this government? If you chose the latter you are a big part of the problem.	
Build Resilient infrastructure with appropriate technology	Auto manufacturers in USA and Canada have completely abandoned the low end of the market. North American automakers are bent on making expensive plug-in vehicles that only wealthy households can afford. "I think that the danger is that if tariffs] enable automakers to slow down the transition to electric vehicles. Our EV industry becomes weaker, not stronger."	
	Canada and the states did not democratize EVs. They gentrified EVs by manufacturing EVs for the luxury market and for high profits and shareholder value	Incentive program offered by the federal government in Canada towards the purchase of Battery Electric Vehicles
	Why the sudden concern and just about EV's? Cheap labour and poor environmental standards were the reasons western companies have offshored their manufacturing to China for decades.	
	China supplies most manufactured goods we buy now. Why not EVs? But they will get hit with a significant import duty. No doubt about that. The government will want to protect its significant "investment" in the domestic EV market plus all of the jobs and votes that go along with that in ON and PQ	
Affordability, tax deductible investment in EV, Heating and cooling and good customers	Car companies are not really interested in making affordable electric vehicles. They want customers who will eventually buy more expensive, higher-margin products. New car choices have skewed so heavily toward bigger crossovers, SUVs and trucks. No company wants to offer a 200-mile-range EV for 25 grand.	
	Buick, Lincoln, Polestar, and Volvo all sell cars in the US that are made in China.	

Table 7. Author: Troy Neranjan, Abductive Analysis Theme TWO

Beginning with a participant's commentary reading: 'Bottom line is what you support?, our economy and jobs or the crazy dreams of this government? If you chose the latter you are a big part of the problem" deserves understanding the evolving auto market in Canada.

The current passenger vehicle owners are an inextricable partner in the EV value chain, its' global market dynamics have threatened legacy auto manufacturers in the western world. The consequences have reached an inflection point in Canada which is a high stakes economy vs. climate dichotomy. The import of Chinese EV that may enable the "reduction of national greenhouse gas emissions by 2030" is at stake as much as the EV industry and good paying 150,000 direct and 550,000 indirect jobs. The US – Canada Auto industry is an alliance of transplants that export and import manufactured vehicles between the two countries. A major trade decision of USA with China has an impact on Canadian industry and, in light of the 100% tariff imposed by USA on Chinese EVs, many industrial policies precede and determine the EV purchase incentive program applicable to imported Chinese and North American EVs. Therefore, Canadian consultations are focused on protecting the auto sector jobs and sustaining the government's secured investments which are "$ 46 billion for electric vehicle assembly, battery and battery components after granting a 10 per cent "EV Supply Chain investment tax credit to attract investment across three" new "supply chain segments". Thus, required to counter balance the impact of Chinese EV's in order to meet carbon mitigation goals, Mikkonen, Gynthner et al. (2020).

One participant is concerned that the auto industry has withdrawn from manufacturing low end EV's for the middle class. Another says manufacturers gentrified the EV market and cater to the luxury segment. They claim the imported Chinese low priced, quality passenger EVs cost almost 1/3 rd the price of North American low - end vehicles, Chevy bolt was selling at $38,000 but, currently discontinued including several other models. Manufacturers blame high costs of production and low demand, Adoba & Dioha, (2021). However, it is contestable, participants assert that a 100 year long business model that yields high profit margins restrict these companies from offering a 200-mile-range EV for mere $ 25,000. "Tesla CEO Elon Musk told industry analysts that Chinese EVs are so good that without trade barriers", "they will pretty much demolish most other car companies in the world", Kharpal , A. (CNBC 2024). Therefore,

an examination of unfair trade and competition by China entailing increased carbon emissions , human rights violations, deep government subsidies and intentional over production are accounted in contrast to Canada's climate record as a pathway to internalizing those costs before allowing their entry to the Canadian market.

Nonetheless, a 100 % tariff applied on Chinese EVs would still fall within the price range of $ 20,000 – 25,000 for their popular four door BYD Seagull compact. To which, survey Question 15, response (n=18) is found to be 6 disagreed, 7 slightly agreed and 5 strongly agreed - 66% agree with this price even after a presumed 100% tariff. However, it is unknown if their preference would change when presented with a Chinese made vehicle. Another commentary posits that apart from Tesla vehicles sold in Canada are from China, Buick, Lincoln, Polestar, and Volvo also sell cars in the US that are made in China. Barry, K (Consumer reports 2024). Hence, prospective owners' willingness to participate in the transition is a concoction of their attitudes for and against all the above. Survey response has received a 100% affirmation to enjoying refundable tax credits for the purchase of new and used EVs. Thereby, Green policies to increase sales could be nudged by offering 100% refundable tax deductible credit spread over five years stipulating a price cap on the purchased new EVs, "the risk is that manufacturers inflate their prices in line with the subsidy", Bakker & Trip (2013). This will also enable access and affordability to prospective low income earners buying a pre-owned EV within the first five years and enjoy tax credits. The goal would be to penetrate the middle class mainstream market, because ubiquity brings accountability and acceptability of the green economy, Falbo, Pelizzari et al. (2022).

How a "Systems Thinking" process would empower peoples' capacity and the overall enrichment of human well – being in harmony with the natural environment?

Clustered interpretation	Dynamic resonance	Theme
Mitigate and Adapt to Low - carbon industries	In 2023, shipments from Canada to China increased by +25.4% y-o-y to 10.5 mln tonnes. In fourth place was India, with a 6.2% share of Canada's coal exports. In 2023, 3.1 mln tonnes of coal were exported from Canada to India, up +22.8% y-o-y. In fifth place was the EU, with a 5.8% share of Canada's coal exports.	
Decouple emissions from economic growth	Canada burns coal. The major oil producing province burned coal until recently. They still burn gas. To produce a product that causes more emissions.	"Systems Thinking" process would empower peoples' capacity and the overall enrichment of human well – being in harmony with the natural environment?
	Increased use of energy and the energy mix is expanded. The displacement happens slowly at first and accelerates. That's how all technological displacements happen.	
Public private partnership in the ownership of renewable energy assets	Government must stop the subsidies and invest those funds in green energy projects. Get CPP,our contributions to invest in these projects.	

Table 8**. Author:** Troy Neranjan, Abductive Analysis Theme THREE

The cluster, "Mitigate and Adapt to Low - carbon industries", response was (n=18) 6% disagree, 20% slightly disagree, 50% agree and 20% strongly agree. While an aggregate of 70% are favourable, a notable 30% remain unfavourable to this proposition. A staggering export of coal particularly to China, India, EU and the abundant use of coal, oil and gas as a primary source of energy for generating electricity in a few provinces, **Fig. 9,** means fossil fuel expansion than a transition. Further, industrial heat production and compression, oil heating systems, inevitable methane emissions, inefficient space conditioning equipment in buildings, water heating etc., Navius Research, (2023) and "burning natural gas to generate enough heat and steam to melt the oil out of the sand, Rainforest Action Network", (2024), corroborate the detriments and constraints in Canada's natural resource based emissions intensive economy, Njeru & Muchiri, (2016).

In the present human life system, the Right to Life is a universal axiom which is also attributed to oil and gas as previously emphasized in the "hockey stick of economic growth", **Fig.7,** for its value of energy security. However, oil is also larger than its energy value and content; petrochemicals are the by – product of oil that encompass the supply side of industrial, pharmaceutical, healthcare, plastics, fabrics and beauty care markets. Therefore, it's questionable if oil would be completed removed from use in people's lifetime.

To "decouple emissions from economic growth" the responses was (n=18) show 6% disagree, 13% slightly disagree, 65% agree and 17% strongly agree. Using clean energy culminates in the decoupling of emissions from Economic Development (ED) through growth stages, González, Rosa et al., (2024). The present Government policies for all provinces and industries seem wide and deep across 120 economic sectors. These programs are consistent with the net zero targets in Canada and also at developing Clean Energy sectors in the Energy supply, Supply infrastructure, Energy demand in the Buildings, Transport and Industry as illustrated in the Clean Energy Taxonomy, **Fig.17,** These determine the selection of "technologies and processes that affect energy consumption and greenhouse gas emissions". Resulting effects of mitigation policies can change investment to green jobs and training, technology, capital markets and the "household income and consumption", Navius Research, (2023). Accordingly, the survey findings show a total of 82% in favour of decoupling emissions from Green ED and growth, Grossman & Krueger, (1995).

CLEAN ENERGY TAXONOMY

SECTOR CATEGORY	CLEAN ENERGY SECTOR	SECTOR CATEGORY	CLEAN ENERGY SECTOR
ENERGY SUPPLY		**ENERGY DEMAND**	
Clean Energy	Renewable electricity	**Buildings**	Efficient building envelopes
	Conventional nuclear		Efficient HVAC and building controls systems
	Small modular reactors		Efficient appliances & lighting
	Bioenergy	**Transport**	Plug-in electric vehicles
	Waste to energy		Hydrogen fuel cell electric vehicles
	Clean hydrogen		Clean public transit
	Carbon capture and storage	**Industry**	Low carbon machinery
	Emission detection and control		Low carbon steel
Supply infrastructure	Electricity transmission & distribution		Emission detection and control
	Hydrogen and CO2 pipelines		Carbon capture and storage
			Clean hydrogen consumption
			Direct air capture

Table 9. Source: Adapted from Navius Research Inc, Report prepared for Clean Energy Canada

"Public private partnership in the ownership of renewable energy assets" relates particularly to **question 12:** "Transformation of climate-damaging energy system doesn't have to be at the whim of banks and investors who are unwilling to invest; they assess renewable energy as a bigger liability on their balance sheets than fossil fuels"; received an overwhelming response (n=18) 6% agree and 94% strongly agree. This corroborates the research in these two contexts: **1)** Ownership and Transformational investment – "Companies quoted on stock exchanges are worth about $70 trillion with about half that owned by pension companies". **2)** Problem identification in Human system dynamics - "if you have a "problem statement" that is gravely deficient, such a statement can disorient the efforts to solve a problem fraught with confusion and misinformation." Therein, Policy makers implicitly compromise on reciprocating vulnerability, emotionality and authenticity with citizens and society, Schneeberger et al. (2023).

Because, business and government policymaking conveniently embrace the idea of the single right answer, they assure there was "no subjectivity" involved in their decision. But, Ontology warrants that phenomenal "subjectivity" to understanding the nature of multiple realities existent in society that are emphatically inspired by human dynamics, behavioural economics and psychology!. In that, policy makers have managed to elude complementarities, the actual reforms needed in the economy such as the Fossil Fuel Subsidies (FFS) Swap, FFSR (2009) to renewable energy infrastructure and necessary incentives to reduce the cost of green energy to consumers, Kania, Williams et al. (2022). These "subjective" findings signal the interest of households and their opportunity to participate in green technology investment at scale, equitable, universal ownership and a symbolic control and ownership of the evolving green economy and its system, Quigley, E. (2019). Conceivably, it can be realized through Workers' pension funds and government pension plan (CPPIB) that have a large share of investments in the fossil fuel industry, that could be accessed to invest enormously in the green economy, Croce et al. (OECD 2011), Pastor et al. (2022). "Canadian pension funds hold more than $4 trillion in assets", Shift Action, (2024).

What is achieved by Thematic Objective ONE?

Objective ONE	Outcome	References
Are the households in Canada inclined to transition by owning and operating an electric vehicle or prioritize on carbon emission reduction in home heating and cooling systems?	The median Canadian household has over 50 percent of their wealth invested in their home. Two-thirds of Canada's housing is owner occupied. Baby boomers are aging and they mostly want to age in place. A low carbon emissions environment is important for realizing an extended life expectancy. This obviously influences their decision to invest in a trending technology that helps appreciate the value of their treasured long term investment. Therefore would prioritize affordable transition with government policy incentives to low emission heating and cooling systems and also avoid paying the incremental carbon tax plus 13% HST levied for the use of natural gas. Research and survey findings are evident of owner occupied households taking advantage of the government's Greener homes program incentives to install Heat pumps in their homes. In fact there is a large backlog, applicants awaiting the completion of Heat pump installation projects, owing to the depletion of funds allocated to this program. Thus, align with theories and policies of a highly leveraged / financed wealth accumulation that painstakingly redress household income and wealth disparities created by the fossil fuel energy based market economy dependent on government subsidies and credits for emissions mitigation. However, the assertion of Economists that "carbon tax is the least-cost way to reduce emissions" is precluded by the active energy transition of households. They would not pay the additional charge of Carbon Taxes at $80/ tonne CO2; increasing to $170/ tonne by 2030; this component is also higher than the cost charged for actual usage of natural gas. They would eliminate the use of natural gas, very likely, in all circumstances.	Somerville. T., Qiang, L., Teller, P. et al. (2007), Are Renters Being Left Behind? Home ownership and Wealth Accumulation in Canadian Cities, Carter, T. (2004), Canadian Housing Prices: The Road to Wealth?, Maroto, M. (2019) Fifteen Years of Wealth Disparities in Canada: New Trends or Simply the Status Quo? and Friedmann, R. (2006), Time to Sweep the Dust from under the Rug?, Moving Beyond "Business-As-Usual" Energy Efficiency, Pacific Gas and Electric.

Table 10. Author: Troy Neranjan, The Achievement and Outcome of Thematic Objective TWO

What is achieved by Thematic Objective TWO?

Objective TWO	Outcome	References
What do the households think about the incentive - rebate program offered by the federal government in Canada towards the purchase of Battery Electric Vehicles (BEV)?	Canada is far behind in meeting Zero emission vehicle targets. Domestic auto manufacturers' lacklustre participation in the production of affordable EVs, notwithstanding government incentives, warranted consideration for import of Chinese EVs. Research and survey findings revealed the explosion of resistance from industries ranging from auto to steel and aluminium; including the federal government that has invested heavily in the EV supply chain with foreign and local auto makers. Consequently, the intended low carbon economy and EV adoption has shifted focus exclusively to protecting the domestic auto industry, jobs and energy security of the alternative energy sources by preventing foreign investor acquisition of mines; rare earth and mineral resources essential to electric battery technology, research and production. These are emergent properties denoting the political-economic barriers in advancing the low carbon economy transition. Domestic EV technology is far behind China in offering a higher battery range at an affordable price. Therefore, trade entry barriers discourage the "technology spill over" from competition and the availability of technologically innovative quality EVs from domestic manufacturers; except paying the prices of a gentrified domestic market or an increased cost for 100% tariff imposed Chinese EVs. Implicit in this shift is a stark contradiction of Canada's 'Electric Vehicle Availability Standard', depriving accessibility and affordability of EV ownership for prospective owners. Canadians are restricted from their need and desire in averting the additional payment of an incremental fuel charge for using an ICE vehicle; currently at 17.6 cents/ litre and increasing to 37.43 cents/ litre by 2030, while living through a cost of living crisis.	Fan,Z., Cao, Y., Huang, C. and Yongli, L. (2020), Pricing strategies of domestic and imported electric vehicle manufacturers and the design of government subsidy and tariff policies., Ma, S., Xu, J. and Ying Fan, Y. (2019) Willingness to pay and preferences for alternative incentives to EV purchase subsidies: An empirical study in China,, Langlois-Bertrand, S., Benhaddadi, M., et al. (2015), Political-institutional barriers to energy efficiency., Alter, L. (2023) Blueprint for Decarbonizing Transportation and It's Amazing Climate policy is transportation policy is energy policy is housing policy. Everything connects, Perrault, L. and Scholz, T. (2024) Electric Vehicle Availability Standard: Potential Impacts on Ownership Costs and Charger Supply.

Table 11. Author: Troy Neranjan, The Achievement and Outcome of Thematic Objective TWO

What is achieved by Thematic Objective THREE?

Objective THREE	Outcome	References
How a "Systems Thinking" process would empower people's capacity and the overall enrichment of human well – being, in harmony with the natural environment?	Transition to Green energy and policy "cannot be viewed as simply technical in nature but rather the product of collective social and cultural factors" bearing societal trade-offs that aren't adequately understood. **C**oncerns are accessibility, affordability, acceptance or resistance to policy driven by human system structures, adaptive capacity and the political - economic interests. This research and especially the survey findings provided insights into understanding the ontological, societal relationship to energy from a multi-faceted perspective that reflect a collaborative pursuit of the evolving economy. For example, economic ownership in the green economy, retirement pension funds investment in renewable energy projects etc. that can balance the dearth of Renewable energy project investments of institutional and corporate entities. This maturity resonates with the Life Centered Systems Thinking; a shift away from the energy – centered economic systems, leading to "social innovations" and "new solutions that can meet a social need more effectively than existing solutions". Emergent properties in systems thinking stem from the dynamics of complex interrelationships in a system. This can expose otherwise unforeseeable consequences which trickled in the survey findings as per design and participants' voluntary commentaries. They discover "new or improved capabilities", relationships and "better use of assets and resources", most preferably, in a democratic manner targeting equality in economy based property ownership and wealth distribution. Carbon mitigation, Low carbon economy or Energy transition to Renewable energy is not a techno – economic problem, but a social promise for human well being and empowerment.	Dunlop, T. (2019) Mind the gap: A social sciences review of energy efficiency., Mikkonen, I., Gynther, L., Matschoss, K., et al. (2020) Social innovations for the energy transition., Georgiou, I. (2003) The Idea of Emergent Property, Wolsink, M. (2013) The next phase in social acceptance of renewable innovation., Quigley, E. (2019) Universal Ownership in the Anthropocene, Croce, R., Kaminker, C. and Stewart, F. (2011). "The Role of Pension Funds in Financing Green Growth Initiatives",

Table 12. Author: Troy Neranjan, The Achievement and Outcome of Thematic Objective THREE

Validity and Reliability

The purposive sampling selected for the survey employed a Likert scale for responses. Answers to closed- end questions were quantifiable and enabled a clustered interpretation of participant's strength of agreement for each question. Thus validate the expected outcome of the survey design. Further, the survey reached an extra ordinary milestone when the participants voluntarily expressed their convictions, sentiments and expectations that enriched this analysis. These contributions, presumably from mostly professionals, signify their commentaries as informed and reliable.

RECOMMENDATIONS

The survey insights declare the participants' intention to avail themselves of the following: Affordability, Accessibility, Acceptance and Acquisition – the "4 As". Therefore, recommendations are in pursuit of the cumulative effects of the "4 As", because the goal of climate accountability can't be to increase top line business revenue, rather to develop a sustainable economy for the people and nation.

1. Examine the feasibility of granting a 100% refundable income tax credit, proportionate or variable percentage deductions across a 5 year period, for the purchase of an EV with a limit imposed on the purchase price, $40,000 - $45,000.

2. To increase the federal budgeted funding for its Green Homes program. Grant this inventive as 100% refundable tax deductible credit across a 3 year period; maximum project price, $15,000 -$20,000. This would encourage households to finance their own project, manage and expedite their transition to heat pumps without the fossil fuel industry influences and barriers. Provide loans to low income households and the tax incentive as above.

3. Introduce stringent policies, regulations and Paris - Agreement aligned energy laws. This will denote certainty to investors, pension fund managers and other financial institutions

and enable Canada to achieve its climate goals; 440 Megatons by 2030 and Net zero by 2050.

4. Initiate discussion with economic development policymakers to implement the FFS swap at the earliest of 2030.

5. Examine the possibility of selling equity shares of the $51 billion dollar TMX crown corporation to the general public; shares worth $1000.00 maximum to each taxpayer following the planned 1/ 3 rd of share allocation, by loan, to Indigenous communities. This initiative precludes the imminent and unreasonable sale of this tax payer funded corporation to the fossil fuel industry at a significant loss. Gratify and empower all citizens with an endowment of economic ownership and control in the wealth of Canada's natural resources, future decisions and evolution - the opposite of a good idea is another good idea!

Future Research Question

Where techno- economy based energy efficiency policymaking has struggled to deliver social justice and equity in human well being, future research can be undertaken to address the following questions:

1. How the preconditions of a fossil fuel based economy impact the human relationship to energy and energy transition?

2. How does social innovation contribute to transforming the techno - economic business model to a socio- technological low carbon economy?

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APPENDIX: *Survey*

QUESTIONAIRRE

Human-caused climate change refers to a change in global or regional climate patterns attributed to the use of fossil fuels and consequent emissions of carbon dioxide and other greenhouse gases. *Please circle or check mark your chosen answer.*

1. A greenhouse gas is any gas, including carbon dioxide (CO2), methane and nitrous oxide that trap heat from the sun in the atmosphere, causing it to warm up in the same way as a greenhouse.

a: Strongly disagree, **b:** Disagree, **c:** Slightly disagree, **d:** Slightly agree **e:** Agree **f:** Strongly agree, **g:** Do not wish to answer.

2. Energy-related emissions are those caused by using energy (coal, gas and oil) for 1) generating electricity, 2) transport, 3) buildings and 4) industrial processes and are distinct from emissions caused by farming or burning felled trees,

a: Strongly disagree, **b:** Disagree, **c:** Slightly disagree, **d:** Slightly agree **e:** Agree **f:** Strongly agree, **g:** Do not wish to answer.

3. Coal makes up three-quarters of the CO2 produced in generating electricity. Stopping all new coal plants and closing those in developed countries has put Canada on the right track in the electricity sector.

a: Strongly disagree, **b:** Disagree, **c:** Slightly disagree, **d:** Slightly agree **e:** Agree **f:** Strongly agree, **g:** Do not wish to answer.

4. Transport is the fastest-growing CO2 emissions problem, and car sales are going up. Ban all Canadian sales of traditional cars by 2035 and invest in electric cars.

a: Strongly disagree, **b:** Disagree, **c:** Slightly disagree, **d:** Slightly agree **e:** Agree **f:** Strongly agree, **g:** Do not wish to answer.

5. Cutting emissions in all areas needs new technologies. Better electric vehicle batteries and charging infrastructure, sustainable fuel for planes, green hydrogen, low – carbon or clean energy for electricity, carbon capture from factories and reforestation.

a: Strongly disagree, **b:** Disagree, **c:** Slightly disagree, **d:** Slightly agree **e:** Agree **f:** Strongly agree, **g:** Do not wish to answer.

6. Population and economic growth mean that road transport is on the rise. In order to deal with this, we must electrify all new buses, vans and transport trucks and push for almost all vehicles on the road to be electric by 2050.

a: Strongly disagree, **b:** Disagree, **c:** Slightly disagree, **d:** Slightly agree **e:** Agree **f:** Strongly agree, **g:** Do not wish to answer.

7. Cement, steel and glass, manufacturing causes lots of pollution. Industry alone makes up about a quarter of energy-related CO2 emissions. Demand that 40% of steel and 15% of plastics come from recycled materials by 2030.

a: Strongly disagree, **b:** Disagree, **c:** Slightly disagree, **d:** Slightly agree **e:** Agree **f:** Strongly agree, **g:** Do not wish to answer.

8. Oil and gas facilities are the largest industrial emitters of methane in Canada. Methane (CH_4) is the main component of natural gas. A colourless, odourless flammable gas, methane is a potent greenhouse gas (GHG) with a global warming potential that is more than 80 times greater than carbon dioxide (CO_2) over a 20-year period, and more than 25 times greater over a 100-year period. Cutting CO2 is the number one priority. Deal with methane later.

a: Strongly disagree, **b:** Disagree, **c:** Slightly disagree, **d:** Slightly agree **e:** Agree **f:** Strongly agree, **g:** Do not wish to answer.

9. Dealing with gas leaks, covering landfills, flooding old coal mines, and less beef and dairy in diets would help cut methane emissions and a huge step towards net zero.

a: Strongly disagree, **b:** Disagree, **c:** Slightly disagree, **d:** Slightly agree **e:** Agree **f:** Strongly agree, **g:** Do not wish to answer.

10. Climate change adaptation involves helping societies to adapt to temperature rises — both now and in the future. This means building infrastructure for renewable energy (Solar, wind and battery storage for grid systems) that can cope with new climatic conditions, and exploring new ways of cooling and heating buildings and homes.

a: Strongly disagree, **b:** Disagree, **c:** Slightly disagree, **d:** Slightly agree **e:** Agree **f:** Strongly agree, **g:** Do not wish to answer.

11. The energy transition to green economy must empower the general public to participate in the creation of Green jobs and owning a share of the economy and its wealth, this has been concentrated in the hands of the corporate business organizations to date.

a: Strongly disagree, **b:** Disagree, **c:** Slightly disagree, **d:** Slightly agree **e:** Agree **f:** Strongly agree, **g:** Do not wish to answer.

12. The transformation of our climate-damaging energy system doesn't have to be at the whim of banks and investors who are unwilling to invest; they assess renewable energy as a bigger liability on their balance sheets than fossil fuels.

a: Strongly disagree, **b:** Disagree, **c:** Slightly disagree, **d:** Slightly agree **e:** Agree **f:** Strongly agree, **g:** Do not wish to answer.

13. A cost applied to carbon dioxide pollution to incentivize businesses and consumers to reduce carbon-intensive activities. It usually comes in the form of either a tax or a pollution permit that company's trade.

a: Strongly disagree, **b:** Disagree, **c:** Slightly disagree, **d:** Slightly agree **e:** Agree **f:** Strongly agree, **g:** Do not wish to answer.

14. Canada's new rules will effectively end sales of vehicles powered by gasoline or diesel by 2035. To meet the zero emissions vehicle, Batter Electric Vehicle adoption target by 2035, Canada must allow the import of quality Electric vehicles from China at a low cost competing with the North American manufacturers.

a: Strongly disagree, **b:** Disagree, **c:** Slightly disagree, **d:** Slightly agree **e:** Agree **f:** Strongly agree.

15. I intend to own an Electric vehicle in the near future, within 1- 2 years provided the prices are competitive and in the range of $20,000 to 25,000.

a: Strongly disagree, **b:** Disagree, **c:** Slightly disagree, **d:** Slightly agree **e:** Agree **f:** Strongly agree.

16. The federal government's electric vehicle purchase rebate of $5000.00 could be increased further.

a: Strongly disagree, **b:** Disagree, **c:** Slightly disagree, **d:** Slightly agree **e:** Agree **f:** Strongly agree.

17. I would be interested in a tax deductible credit on the full purchase cost of the electric vehicle, which is a tax refund that I can use immediately.

a: Strongly disagree, **b:** Disagree, **c:** Slightly disagree, **d:** Slightly agree **e:** Agree **f:** Strongly agree.

18. Granting a tax deductible credit for used electric vehicles within five years of use would permit those struggling with affordability and also accelerate greening our environment, economy and also reaching Net zero targets.

a: Strongly disagree, **b:** Disagree, **c:** Slightly disagree, **d:** Slightly agree **e:** Agree **f:** Strongly agree.

I would be grateful for any comments or suggestions you might have. Please state the question number, from above, related to your comments. Use next page, Thank you.