Towards Sustainable Futures

USING STRATEGIC FORESIGHT IN THE DESIGN OF TRANSFORMATIVE SUSTAINABILITY

Submitted by
Rebecca Black and Stephanie Rebello

Submitted to OCAD University in partial fulfillment of the requirements for the degree of Master of Design in Strategic Foresight and Innovation

Toronto, Ontario, Canada, 2021

ABSTRACT

The unprecedented scale of disruption brought about by the COVID-19 crisis has brightly illuminated the dysfunction in many current social systems, adding to the litany of pressing planetary issues like mass extinctions, melting ice caps and biosphere loss. It's widely recognized that 'business as usual' and associated incremental, slowed-paced change by political, business and social actors to address climate and social crisis are not sustainable nor sufficient options for the future health and wellbeing of the planet and most of its population. Innovative new ways to design and implement low carbon systems and socially inclusive solutions are required.

For organizations looking to navigate waves of disruption and create opportunities to 'build back better', what are the current and emerging design frameworks for sustainability? What conditions and mindsets are standing in the way of a transition to a low carbon, socially equitable future? And what might be some of the areas of opportunity for organizations seeking transformative sustainability in the future?

This research project explores how organizations might respond strategically to these challenges through the practice of foresight. Strategic foresight is a way of designing and building futures by understanding change through the lens of emerging trends and longtime drivers of change. It allows participants to generate strategies that address the critical uncertainties of tomorrow, and select actions today that may help shape desired futures and outcomes.

Through a literature review, the authors explore the interconnected nature of the sustainability challenge in Canada and what's holding change back. They unearth emerging visions, systems and mindsets of sustainability that can help build a preferable future. Taking an action research approach, insights from the literature review informed a real-world case study during which the researchers designed and facilitated a strategic foresight process with TREC Renewable Energy Coop, a nonprofit leader in community-scale renewable energy and social finance in Toronto, Canada. The aim of the case study is to better understand how strategic foresight frameworks and practices can help organizations gain deeper insights into what the future may hold, and use those insights to develop robust transition capacities that will help guide them from legacy operating systems and mindsets to more transformative and sustainable business models and solutions.

The paper maps the insights gained through the research journey about how strategic foresight might be used by both sustainability and foresight practitioners. For organizations that are curious about the potential power of foresight to design and execute for sustainable futures, the case study section of the paper illuminates the potential. The paper concludes with findings and design principles generated by the dynamic praxis-oriented research process, and ideas for possible next steps and future research to help build the future we need.

ACKNOWLEDGEMENTS

We'd like to acknowledge that this project was conducted on the land of the Haudenosaunee, the Huron-Wendat, the Mississaugas of the Credit, the Anishinaabe and the Metis Nation of Ontario.

We wish to acknowledge and remember that we, the researchers and participants, are settlers who came here, were welcomed and are welcomed still.

We wish to acknowledge and remember that the harm of the First Peoples, the keepers of this land must stop, and that if we do not see, do, think, differently nothing will change.

(credit: Adapted from the poem 'Circles one inseparable from the other' by Kathy Porter, 2019)

This project would not be possible without our incredible support system of friends, colleagues, and supervisors.

To our primary supervisor, Suzanne Stein; thank you for your incredible energy, humour and care. You continue to go over and above for your students, keeping us grounded while allowing us to dream big.

To our secondary advisor, Kevin Morris; we are so grateful for all your time and insight. You challenged us to be clear, focus in on what matters, and to be confident in the face of new frontiers.

To the BEST cohort ever; while we could not be together through this journey, we managed to stay connected, support each other and laugh along the way. We appreciate each and every one of you and are constantly inspired by the work you all do.

To the TREC board and community participants; thank you for the opportunity to work with you on your next chapter. You took a chance on a new process during a difficult time, and you brought incredible energy and participation every step of that way. We would not have accomplished this project without this smart, experienced, innovative group, who brought their ingenuity, their breadth of talent, knowledge and insight.

Finally, to our wonderful partners Don and James; By now, you could likely write this paper yourselves. Thank you for listening, supporting us, and generally allowing our partnership to flourish at our kitchen tables.

We'd like to dedicate this to those passionate about designing and building a resilient society and planet. We know it gets tiring, but it is your relentless optimism that is going to ensure we're successful.

Contents

LIST OF FIGURES

LIST OF TABLES

LIST OF IMAGES

INTRODUCTION

There is growing attention and awareness of the rapidly evolving climate crisis. As professionals working within the sustainability sector in Canada, we are acutely aware that current efforts to curb carbon emissions and achieve climate stability are insufficient. There is an immediate need for transformative change and innovation to tackle a growing crisis. How might we answer the need?

As researchers of innovation, systems change and futures thinking, we explored the role design and strategic foresight might play in enabling sustainability focused organizations in building transformative, resilient futures. Specifically we posed the research question:

> How might sustainability-focused organizations use foresight methods to move from incremental change to transformative sustainable strategies?

By addressing the primary question, some other questions emerged:

- What are emergent design frameworks for sustainability?
- What are some of the current conditions and mindsets standing in the way of a transition to a low carbon, socially equitable future
- What are some of the areas of opportunity for organizations seeking transformative sustainability in the future?

We set out to learn more, and through fortuitous connections, we secured the opportunity to design and execute a strategic foresight process for TREC Renewable Energy Cooperative (TREC), a Toronto-based non-profit organization that was looking for innovative strategic directions. This exciting case study was an invaluable opportunity to apply theory and put frameworks into practice.

The FutureTREC strategic foresight project was launched in summer 2020, and for the next six months, formed the practical backbone of this action learning journey as it unfolded in the following stages.

- (Systems) Our research project involved grounding ourselves in **the context of the project** with a literature review that deepened our understanding of the systems and mindsets that hold Canada back from achieving meaningful progress on sustainability.

- (Interventions) For inspiration and insights, we investigated and mapped some **emerging design and sustainability frameworks** that we might use as systems interventions when designing for sustainability.
- (Inspirations) We studied interesting **projects** from similar markets around the world that used strategic foresight and design to help develop sustainable innovations. We spoke with a range of diverse experts to deepen our understanding of different voices and bring new perspectives to the process.
- (Praxis in 4 Stages: Case Study) As we executed the research, we applied our learnings to the design of the **real-life case study** with TREC, and as we applied our learnings, the design of our project evolved. This 'action learning' project was a rich and hopeful 4-stage process involving extensive collaboration with TREC and its community.
- (Sensemaking) We sought and shared insights on the process and outcomes from the participants' and the researchers' perspectives, and synthesized action learning experiences, inputs and observations to generate **insights and principles** for designing for transformative innovation towards sustainability.

We are pleased to share this journey with you here. Our hope is that this research adds value to the growing and evolving body of work within the design for sustainability field. For students and practitioners of strategic foresight and design, our process might stimulate reflection on the role of design and the role of the design practitioner through the growing climate crisis.

For sustainability practitioners, we hope that these tools might inspire new approaches and frameworks for envisioning your vision of a sustainable future. For purpose-driven organizations seeking disruptive and transformative approaches to sustainability, we hope this report showcases how strategic foresight and design tools may enable new ways of growing your business while contributing to a sustainable and inclusive world.

About the researchers

Rebecca Black leads boutique communications and design consultancy Black Current, where she works with a range of international clients seeking low carbon solutions and behaviours to address the climate crisis.

Rebecca relishes strategic design problems, creative branding and communication challenges, and the opportunity to build teams and campaigns that create a more sustainable future. She is Co-Founder of Women in Renewable Energy WiRE and Director at TREC Renewable Energy Cooperative. Rebecca holds a Master of Environmental Studies specializing in Business & Sustainability from York University, and this major research project marks the completion of a Master of Design program in Strategic Foresight & Innovation at OCADU.
linkedIn: linkedin.com/in/reblacka

Stephanie Rebello is a design researcher and strategist specializing in sustainability and purpose driven programming, Steph is focused on building equitable and inclusive communities, products and services.

After spending five years in the non-profit sector managing strategic corporate partnerships, and in corporate and youth leadership facilitation, Steph has since moved into the corporate sector. Here, she is focused on helping leading Canadian organizations embed social and environmental impacts into their mandates. Steph holds a BA in Sociology from Western University and is completing an MDes in Strategic Foresight and Innovation at OCADU.
linkedIn: linkedin.com/in/srebello

About case study partner TREC

Toronto Renewable Energy Co-op (TREC) is a nonprofit cooperative corporation focused on incubating organizations tackling challenges in the clean energy and social equity space. TREC's vision is of a world where people work together, pooling their resources, to realize and benefit from a democratic, 100% renewable energy economy (TREC, n.d.). In support of their vision, TREC has become an innovating pioneer in renewable energy solutions, incubating community power co-operatives, a renewable energy youth environmental education charity, and a social finance and impact investment capacity-building hub to spur community investment in iconic projects. TREC has also informed renewable energy policy through research, partnerships and advocacy efforts.
trec.on.ca

SYSTEMS: UNDERSTANDING TODAY'S INCREMENTAL PACE OF INNOVATION TOWARDS SUSTAINABILITY

SYSTEMS: Understanding today's incremental pace of innovation towards sustainability

As sustainability practitioners frustrated by the slow pace of change, we set out to gain a deeper understanding of why we are collectively unable to make more headway on sustainability, and why we are stuck in an incremental change process when bigger action is urgently needed. Identifying the history and emerging actions associated with sustainability in Canada provided useful insights of the legacy mindsets and systems that resist the transformative change needed to address the climate crisis.

Towards a deeper understanding of sustainability

As the impacts of climate change increase, sustainability as practiced by business must be called into question. The need for sustainable solutions is great: The planet will host a global economy 15 times its current size by 2050 based on today's economic trajectory, with a contradictory need for carbon intensity 130 times lower than today by the same date (Kandachar, 2013). Are current sustainability-focused frameworks and practices suitable and up to the task against the social and ecological challenges posed by climate impacts in the coming years?

Sustainability, as originally coined by the United Nations World Commission on Environment and Development, is "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987). Since then, business has adopted a range of sustainability approaches, from triple bottom line accounting (Elkington 1998), to environmental reporting tied into Sustainable Development a do (GoC 2017), to carbon disclosure and benchmarking. The results are not encouraging: current strategies have created only incremental reductions on carbon emissions, well below those needed to meet the Paris Agreement and limit global warming climate below 2 degrees Celsius (IPCC 2018). With decades of delayed action, relying on incremental actions to stabilize climate change impacts has failed.

Sustainability in Canada

Canada is among the top 10 global emitters and one of the largest developed world per capita emitters of greenhouse gasses (Boothe & Boudreault 2016). It too has fallen behind its stated targets, with no net reduction in greenhouse gas emissions over the past 20 years (ECCC 2020). As one of the wealthiest nations on earth, Canada should be well-poised to invest in sustainable solutions.

A historical review illuminates how Canada's history and worldviews have constricted the country's ability to respond to climate change. These insights help to inform possible solutions and point to the need for transformative innovation now in Canada.

Canada's early history with sustainability

Since the arrival of early European settlers in North America, the land and its natural resources have been conquered for profit while First Nations and Indigenous communities,

who held intimate knowledge and relationships with the environment, were relegated to reserves. This collision of ecological relationships, the rejection of indigenous worldviews and the resulting domination of European ideas, established ecological and cultural perceptions of Canadian natural resources as abundant, far-reaching and profitable (MacDowell, 2012). Rapid industrialization spurred a conservationist movement amongst Canada's middle-class elite in the late 19th century, challenging the rampant exploitation of timber, fish and wildlife resources. Predominantly white, older farmers, scientists and foresters pressed for efficient management of resources, giving rise to Canada's first Commission for environmental issues that legislated private development and resource management for public health and safety. This established a precedent of environmental action typically reserved for the elite and wealthy who could afford to think and act this way.

A pro-business shift and economic boom in the early 20th century laid waste to the Commission, with agricultural acreage, timber, pulpwood and fisheries exploitation on the rise. This pattern has repeated itself throughout the ensuing century. The capitalist underpinnings of free enterprise prevent elite-led conservationist movements from taking hold, while economic growth and the maximization of profit remain the dominant priority (Bocking 1997).

Shifting towards sustainable development

A mid-century post-war consumer culture drove explosive economic growth alongside the rapid expansion of Canada's oil and gas resources and a race towards nuclear energy and uranium extraction. Negative environmental and human impacts were rampant, disproportionately impacting First Nations and Indigenous communities (Woynillowicz 2005). The 1992 United Nations Earth Summit represented a global turning **point** in facing planetary environmental challenges and climate change. The government of Canada stepped up to the plate, leading the Montreal Protocol on substances that deplete the ozone layer (Hrvatin, 2016).

Canada did not maintain this leadership role. The government pulled out of the Kyoto Protocol in 2002, blaming a lack of participation of China and the United States. In reality, Federal government parties had not enacted nor enforced policies that would allow Canada to meet its targets. Staying in and meeting the goals of the protocol would have meant purchasing about 14 billion dollars in carbon credits as penalty payments (Curry & McCarthy, 2011), a suicidal political option. In 2018, Canada ranked 25th out of 180 countries on environmental health, scoring particularly low on climate and energy, sustainable fisheries and air pollutant emissions intensity (Yale Center for Environmental Law & Policy 2019).

The current Liberal Federal government renewed Canada's commitments to sustainable development with the signing of the Paris Agreement in 2015, which aims to limit global temperatures below 2°C and strives for a carbon-free world before 2100. Canada's commitment included $2.65 billion over five years to help developing countries battle the impacts of climate change (The Canadian Geographic Enterprise, 2016). The Federal government mandated 26 government departments and agencies to prepare their own sustainable development strategies that embed poverty and health outcomes and called for circular economy principles to be heavily emphasized and incentivized. A new cross sectoral Sustainable Development Council including indigenous leaders is exploring significant partnerships with Indigenous communities and alignment with truth and reconciliation strategies (ECCC 2019).

A systems approach: How are these mindsets impacting sustainability in Canada today?

In order to move towards transformation in a social system, one needs to understand both the deep and apparent structures within a system, the interactions and interdependencies among system parts, and the characteristics that dictate the behaviour and lived experiences of system participants (Foster-Fishman et al, 2007).

How has our history with sustainability impacted our actions and mindset in Canada, today? Using a multifaceted framework to ensure that a range of implications were considered, we unpacked some of the components of this system, taking inventory of the orthodoxies, beliefs and assumptions which dominate the country's capitalist economic and social systems today. These modern behaviours, some of which challenge dominant systems, may have relevance to organizations seeking transformative innovation for sustainability.

Social norms and systems

Modern lifestyles are not compatible with the urgent change that is needed. By and large, people have accepted the perks of a capitalist system with its reliance on cheap, convenient products and services, and rely on external technical and government fixes for climate change. The capitalistic version of sustainability– green premium products – remains largely reserved for Canada's elite as status indicators. Canada's historical racism and ignorance of Indigenous relationship and connection to the environment shows some development toward learning and benefiting from Indigenous approaches to conservationism and land protection.

Technological advancements and Economic structures

Diluted by weak corporate social responsibility campaigns and 'green-washing', the onus of environmental action has shifted towards the design of new products and cleantech. As the internet drives both transparency and confusion, motivated consumers can gain a greater understanding of the impact of their purchases. Sustainability has morphed into its own desirable eco-market brand. An historical dependency on extractive industries perseveres but is being outpaced by the quickening rate of well-paying jobs in the tech sector.

Environmental damage and climate events

Activism around climate is on the rise, driven by youth concerned for the future and heightened awareness of living conditions for indigenous people (Russell, 2020). The waste system produces an estimated 3.3 million tons of plastic, 2.8 million of which ends in landfill (Young, 2019). In 2020, despite an increase in climate-related events like flooding and wildfires, proactive and long-term environmental action has been sidetracked in favour of short-term, emergency measures to address the economic impacts of the COVID-19 pandemic.

Political structures

"Every country on this planet has had a "green" option to lead their governments through the climate crisis, but for the most part we do not choose them" (Zarnett, 2020). Large systems are resistant to change, and the link between social responsibility and environmental sustainability has not been made at large scale. Fractured and opposing governments at all levels, and poorly structured regulation, hold progress on sustainable solutions back or remove historic safeguards entirely in the name of economic development. A transition to low-emission solutions impacts the various regions and societies differently, leading to negative competition and interjurisdictional friction over tactics like carbon pricing, and weakening the capacity of the Federal system to deliver on climate.

Values

A common definition of sustainability is not available or prevalent. It separates environmental action from social responsibility from corporate citizenship, leading to ambiguity and misalignment among sustainability practitioners and strategists, who work in silos, tackling small slices of the wicked problem of sustainability. Consumer culture acts as a significant inhibitor of sustainable practices, championing laissez-faire development, individualism, the right to property, and the virtue of private domesticity, and corrupting the ability to think past what is directly in front of us and place the 'greater good' at the forefront (Manzini 2013).

INTERVENTIONS: EMERGING DESIGN AND SUSTAINABILITY FRAMEWORKS

INTERVENTIONS: Emerging design and sustainability frameworks

Our research brought us to a place of deeper understanding of why incremental change towards sustainable solutions is prevalent. The research process was conducted during a time of dynamic social and economic disruption in Canada and around the world due to the COVID-19 pandemic. In the midst of rapid and unpredictable changes, there were some signals that action on sustainability and innovation might ramp up.

On November 19 2020, Canadian Prime Minister Justin Trudeau unveiled plans for achieving net-zero emissions in Canada by 2050, stating "Canadians have been clear. They want climate action now" (Tasker 2020). Given the foundational and systemic conditions explored in the previous section, reaching the Paris Agreement and net-zero commitments will require a radical rethinking and transformation of Canada's policy and economic landscape.

With a better understanding of where we are now and the systems that inhibit transformative change, we looked for new visions and transformative solutions that might inform strategies and frameworks that could help Canada reach its new sustainability goals. We also considered, what is the role of the designer in this situation? And how might design help spur the transformative change needed to positively impact sustainability outcomes?

Our research process revealed new and emerging approaches and tools for defining and designing for sustainability. The field of design for sustainability has prompted some different approaches to sustainability, sharing ways for the definition and practice to evolve, and better represent the needs of our current and future world. We discovered foresight projects exploring low-carbon futures with communities around the world, and the different design approaches being used for projects around transformative low-carbon futures.

In this section we explore those new visions of sustainability and design that offer pathways forwards, and delve into case studies of foresight and design projects. The learnings from this research informed and inspired the design and execution of the case study that we were simultaneously conducting with TREC, in which we were using strategic foresight tools and frameworks to investigate how they might help generate transformative innovations towards sustainable futures.

Designing for sustainability

The high level of complexity of sustainability is due to innumerable cause and effect relations that are either unknown or uncertain, involving multiple stakeholders with differing ideas about the 'real' problem (Blok et al. 2016).

Designers must treat sustainability as a wicked problem. To do so, sustainability designers are calling for a more integrated, social learning approach to sustainability. This approach recognizes the need for transformative action and implies a full-scale re-organization of socio-economic institutions.

"... radical changes are needed in the way we produce, consume and socially interact. These changes will be not only technical but also social and ethical. The shared opinion also is that action should be taken now. Moreover, we understand that important contributions to change are directly linked to the role of the design."

– Sustainability in design: Now! Challenges and opportunities within design research (Ceschin, Vezzoli & Zhang 2010)

Ezio Manzini is Professor of Industrial Design at Milan Polytechnic and a leading expert on sustainable design, with a focus on scenario building toward solutions encompassing both environmental and social quality. His research with Barcelona's Elisava-Design School and Engineering draws inspiration from the small but slowly growing practice of collaborative food networks, describing sustainability at its core as *new ways of living and producing*.

Within new ways of production, Manzini argues for the development of new relationships between the local and the global, where the value of local resources increases with greater attention to craftsmanship and local knowledge. The approach realizes circular and ecological production processes, and develops distributed systems for major resources like energy. Each of these qualities are not just based on new technology or emerging green innovation, but on human qualities that require small and connected groups building small and manageable systems that work harmoniously around one another. The author believes that we must learn from these smaller community scaled groups for a framework for more comprehensive sustainable solutions.

He proposes SLOC (small, local, open, connected) scenarios as useful directions for sustainable solutions. This might be accomplished by redefining the essential aspects of our lives; decreasing the consumption of products in favour of increasing other qualities of life, like: the quality of physical and social environments; the quality of relationships with the rediscovery of communities; the quality of becoming active, with the rediscovery of individual and social capabilities; or the quality of time, with the rediscovery of slowness.

These alternative qualities directly contradict current cultural norms and orthodoxies supporting capitalism and growth-driven economies. They support reimagined visions of society that are connected and regenerative.

Pathways to transformative impact

Manzini identifies three emerging pathways to evolve current sustainability practices from incremental to transformative impact:

1) A greater emphasis on **designing product-service innovations** to provide new ways of doing things and re-organizing supply systems. This avoids the incremental eco-efficiency trap which fails to tackle systems of over-consumption and supply chain waste effectively.
2) The need for feasible, flexible and **attractive visions of sustainable and reimagined futures**, which allow people to see themselves in a range of better environments. This avoids the feeling that sustainable choices are only "less of the same" that negatively impact lifestyle and wellbeing.
3) A new set of boundaries around **the value and role of connected places and local economies**. An alternative to an already precarious globalized supply chain, sustainability can start building with a network of collaborative people with a new relationship between the local and the global, one based on bottom-up initiatives and an openness to grassroots social innovation.

FutureTREC Implications

These inform an emerging definition of sustainability which is rooted in "a multiplicity of initiatives performed by a variety of people, associations, enterprises, and local governments who, from different starting points, move towards similar ideas of wellbeing and production" (Manzini, 2013). The viability and potential of community-based solutions shines through Manzini's work, and are strongly value aligned with TREC's democratic, community scaled vision of sustainability.

Design practice and strategic foresight within sustainability

What is the role of design and strategic foresight in the transition to low-carbon futures?

"Visions can be used to problematize current sustainability trajectories and demonstrate the tension between short term actions and long term goals; they can also be utilized to build a network of actors towards a common aim."

– Idil Gaziulusoy, Professor of Sustainable Design at the Department of Design, Aalto University

What is the role of designers?

In an essay calling for a reformation or evolution of design practice, Don Norman shares a growing shift in responsibility as designers grow the number of tools, and how and where they are applied. In order to leverage these tools effectively, designers are inhabiting the facilitator role, responsible for connecting stakeholders and inspiring cross-sector collaboration and creativity (Norman 2014). In a time of societal constraints due to the COVID-19 pandemic, and with the rising number and severity of climate events, designers for sustainability must focus on facilitating desirable and positive visions of the future.

Researcher, professor and founder of German sustainable design agency econcept, Ursula Tichner believed that doing so requires a designer to embody certain mindsets and responsibilities. She suggests sustainability designers must tame their designer ego and recognize their role as simply the holder of process, the communicator or translator. Sustainability designers push participants into creative spaces to uncover the best and most innovative solutions. They critically analyze a reliance on gadgets, cleantech and radical technology, questioning whether the technology is necessary or solving a problem or whether it takes away from the individual's capacity to change. And they apply an accessibility and equity lens, applying the principle of 'design for all' to trigger broader beneficial impact with targeted solutions (Tischner 2013).

Design thinking in the strategic foresight process adds the element of empathetic problem finding, problem framing and problem-solving. Starting with people allows the organization to craft aspirations that are meaningful and powerful to employees and customers alike (Lafley & Martin 2003). A user-centred design approach focused on future ethnographic insights improves the odds of designing innovative or unexpected ideas or solutions that answer the end-users needs (Kolko 2015). This marriage of futures thinking and design thinking can unlock transformative innovation, a "holistic, big-picture approach to (solving) some of the trickiest problems we face" (Candy 2010, 169).

Leveraging design principles for the transition towards low-carbon futures

From the perspective as sustainability scientist and design researcher, Idil Gaziulusoy positions sustainable transformation as a design challenge. Using Jay Doblin's definition of design as a process, and the act of design is employing a process to move from one state to another (Doblin 1987). Design-led sustainability can be described as a tool or process for transformation. Gaziulosky (2017) proposes three core dimensions for the design-led sustainability: creative, technical and political.

- **creative:** The reimagining of current socio-technical systems, and visioning of future governance models, technologies, social practices and norms.
- **technical:** the design of the technological foundations that will support the resilience of communities and support their adaptation to climate change.

FutureTREC Implications

This outline influenced the design of future scenarios that were generated by, and for, FutureTREC participant workshop activities. The scenarios wove together the creative, technical and political dimensions, to provide the prompts necessary for participants to develop resulting strategies that might embody a complete systemic transformation.

- **political:** the negotiation between relevant stakeholders in the design of future systems, ensuring that equal interests are met, and the appropriate processes are in place to manage the transition.

Emerging discourse for climate futures

In the book 'The Future We Choose: Surviving the Climate Crisis', architects of the 2015 Paris Agreement Christiana Figueres and Tom Rivettt-Carnac lay out a pathway for individuals who wish to make choices that will feed the transition to a sustainable future. The authors use futures thinking when they outline two contrasting scenarios of the human experience in 2050, based on choices that can be made starting today. One scenario shows a world in which the Paris climate targets are not met. The other illustrates what it may be like to live in a regenerative, carbon neutral world. The striking differences in quality of life between the scenarios are persuasive tools to confront the climate crisis head-on.

Central to their vision is a call to positively reframe current dominant social and economic mindsets. As "the actions we pursue are largely defined by the mindset we cultivate in advance of the doing" (Figueres & Rivett-Carnac 2020, 37), "attempting change while we are informed by the same state of mind as the past will lead to insufficient incremental advances" (Figueres & Rivett-Carnac 2020, 38).

To meet the pressing need to transform the climate crisis in the next ten years, they promote the adoption of three critical mindsets:

- Choosing gritty stubborn optimism, gaining empowerment by remaining constant in the face of uncertainty, and commit to acting for positive and cumulative impacts that lie beyond the horizon
- Nurturing a mindset of abundance, reaching beyond an individualistic and competitive approach to recognize human-nature interconnectedness, practice collaboration, co-creation and stewardship
- Supporting radical regeneration, caring and connecting to replenish what we use and what future needs will require

The authors reinforce that these mindsets are intrinsic to the human condition and go on to offer tactical actions to build a more regenerative and resilient future with intentional direction, while cultivating these mindsets at the personal, professional and political level.

Theoretical foundations for mapping climate futures

Professors Damian White and Timmons Roberts from the Rhode Island School of Design have explored eight emerging discourses contributing to the design of low-carbon societies, each focused on a different position for eco-centric visions of sustainable futures. The theories offer up a myriad of ways in which sustainable futures might develop and are developing, and inspire new and transformative ways of thinking about and practicing sustainability. In Table 1, we outline each theory, and the insights garnered for the Future TREC case study. As such they offer up inspiring insights into possible futures, including a 'mix and match' approach in which each discourse could build upon another, offering new framings of 'the problem' and defining features of the 'solution'.

FutureTREC Implications

Reinforcing the need to flip legacy mindsets when designing for transformative pathways to sustainable futures. Guiding the ways in which facilitation and communication can help to frame and engage innate capabilities and instinctive mindsets for positive and hopeful change – optimism, abundance, regenerative solutions – through tone, discourse and vocabulary.

Table 1: *Eight theoretical discourses on envisioning climate futures*

Discourse	Premise/Solution	Application
Natural Capitalism Defined as eco-entrepreneurship and transition by "greening" the market.	Premise: Unleashing of green entrepreneurial energies will be the foundation of low-carbon futures. Solution: Placing a price on natural capital and leveraging market mechanisms in the form of capital and trade systems, carbon pricing and accelerated support for green technologies.	Insights for FutureTREC: priced externalities to improve economic competitiveness of future sustainable solutions
Eco-modernism Understanding the environmental crisis primarily as an energy and innovation crisis.	Premise: Transitioning towards low-carbon futures needs the formal innovation system to invest in research and development. Solution: Higher upfront investment to accelerate and modernize energy systems	Insights for FutureTREC: the risk of supporting technical solutions while leaving social solutions behind
Cultivating Socio-technical System Innovation Multi-level system innovation and finding alignment between sectors	Premise: the complexity of our systems requires non-linear solutions. To facilitate transformation, we need to address what needs to change at each level of society. Solution: A greater focus on managing transitions and transition governance to ensure that all sectors and levels are moving together.	Insights for FutureTREC: governance that improves social and community engagement and transparency
Degrowth & Digital Proudhonism A politically defended post-capitalist society	Premise: Without usurping the core capitalist focus on growth, behaviour cannot ultimately change. Solution: Focus on behaviour and lifestyle transition with new forms of public financing, and new sharing economy models that might bolster transitions.	Insights for FutureTREC: Model improves opportunities for community economic models that support sustainable solutions
Social Practice, Design for Transition and Plenitude Shifting normative and cultural values to facilitate transition to sustainable lifestyles	Premise: Social innovation is defined as small ventures that are closely connected, with the connections breeding sustainable transitions and focused impact. Solution: Community-focused networks of social innovations served by local collectives and offering different forms of community provisions.	Insights for FutureTREC: strongly aligned model for local democratic solutions and cooperative / community economic resilience
Red-Green Productivism Political movements that understand the urgency of deploying public power and agency	Premise: More widespread political movements that understand the urgency of deploying public power and democratize public agency to move towards more sustainable decarbonization. Solution: Widespread public investments in diverse energy sources, underpinned by a green welfare state.	Insights for FutureTREC: Inform, align with and support political systems supporting public power and democratic public agency

Discourse	Premise/Solution	Application
Feminist, Queer and Intersectional Transitions No low-carbon future can be built without an in-depth look at structures of power and privilege	Premise: Without inclusion, sustainable visions are building and re-inscribing systems of oppression and inequitable impact within them. Solution: Diverse and inclusive participation addresses underlying issues of race, gender sex, sexual orientation ability and other modes of domination, discrimination and silencing.	Insights for FutureTREC: Design in diversity, equity and inclusion in the strategic foresight process and future strategic directions.
Environmental Justice Transition to a just climate future requires acknowledgement of ecological/carbon debt owed by the affluent majority world to the majority world	Premise: Generates discussion on how energy regimes are entangled with deeply rooted systems of colonialism and imperialism, slavery, genocide and plunder for five hundred years. Solution: Redefine extractive energy relationships globally. The affluent world meets its responsibility to provide support and reparations to the communities and economies they once exploited for resources, as the majority world adapts to rising climate change impacts.	Insights for FutureTREC: Building inclusive, collaborative and scalable futures requires a deep understanding of our historical impact, and the positions of power and privilege held within the TREC organization and ourselves as facilitators.

FutureTREC Implications

We leveraged this categorization when guiding the design of FutureTREC scenarios and strategies. We were able to provide additional areas of inquiry and connect ideas to more profound theoretical influences. Reading through each discourse provided a framework to identify the strength and weaknesses of ideas that were generated during the FutureTREC workshops.

INSPIRATIONS: International projects using foresight for sustainable innovation

Strategic foresighters are pushing the boundaries of traditional sustainability by applying their practices and methodologies to projects that inspire emerging visions for sustainability. This section summarizes the learnings from three such foresight projects, selected intentionally from economically comparable markets to Canada.

EXAMPLE ONE: Pathways to deep decarbonization in Canada

Transforming energy systems by 2050 to achieve a resilient low-carbon economy in Canada

An international project initiated by the United Nations Sustainable Development Network involved forecasting different pathways for the decarbonizing the economy and re-shaping energy systems, and immediate actions that could be scaled to deeper mitigation ambitions in the long term.

Foresight Process:

- **Trend scanning and analysis:** Compiling and investigating global trends and Canada's historical GHG emissions
- **Scenario building:** The team identified a clear driver that had the greatest impact on fluctuating emissions records, oil prices, and built future scenarios around high and low prices of oil.
- **Future pathways:** With the creation of two distinct futures, the project team outlined six main pathways towards decarbonization and immediate action items within each.

Key insights:

The report includes two distinct scenarios - the high-price oil future and the low-price oil future - describing two very different energy economies. An analysis of both trajectories unearthed six market-based pathways, each armed with immediate next steps. The overarching takeaway stated that the goal of decarbonization does not mean the shuttering of industry and focuses on the use of policy and enabling markets to realign how Canada's economy competes (Bataille et al. 2015).

FutureTREC Implications

- The horizon scanning and scenario building provides valuable insights for examining and developing pathways
- The importance of choosing a key driver / critical uncertainty
- Lack of cultural and societal trends results in market-driven pathways
- The role of policy cannot be underestimated as a critical element for a decarbonized and resilient economy.

EXAMPLE TWO: OPEN: Scenarios for a One Planet Economy in Europe

Reimagining policy settings for inclusive and sustainable transformation

This scenario development project centred on exploring how Europe might transform from business-as-usual rate of consumption, which would require the use of 2.5 planets to sustain human life, into what they defined as One Planet Economy by 2050. Their focus was reimagining what enabling policy settings might be necessary for the transformation, using water, carbon and ecological footprint indicators to measure impact.

Foresight Process

- Scenarios were built using a set of back-casting exercises, stretched over two workshops with different stakeholders in attendance.
- The project team used two critical uncertainties – speed of technological innovation, and a quantity versus quality mindset – to develop four distinct future worlds
- The resulting scenarios were further defined through the categorization of policy interventions for economy, labour, resources, energy and trade.
- The scenarios were analyzed across the three footprint indicators to showcase potential impact.

Key Insights:

Process methodology focused explicitly on participation, to gain access to specialized knowledge and diverse perspectives, to create buy-in so as to ensure the use of the results, and for the continued success of the foresight exercise. "It will be imperative to revisit these scenario models and policy settings, to include how our assumptions might have changed. Our scenarios will no longer be effective in inspiring feasible policy solutions if they are not evolving with world events" (Gardiner et al. 2013).

FutureTREC Implications

- Designing in participation generates diverse insights and improves buy-in
- Building capacity in participants to continue the work is an important element of the process: design in the provision of tools and know-how to spur engagement
- Leverage expert stakeholders to generate potential trends and drivers, and review drivers in the critical uncertainty selection

EXAMPLE THREE: Visions and Pathways 2040 (VP2040)

Envisioning the possibilities for an 80% reduction in GHG emissions in four Australian cities

Through a series of participatory workshops, citizen engagement and cross-discipline expert interviews, VP2040 aimed to re-think and re-design the physical, technological, social and cultural fabric of four Australian cities (Ryan et al., 2016). The project culminated in the development of visualized snapshots of the 'future' in which the researchers leveraged the sketched-out conversations and images provided from the workshops. The cumulative process engaged more than 150 participants: experts in design, planning and engineering, and citizens from each of the cities.

Process

- Research and stakeholder engagement illuminated different perspectives on a low-carbon transition, and insight into potential risks and opportunities as perceived by the different stakeholder groups.
- In workshops, participants sketched out new visions for 2040 through conversation, visual depictions and organizing of images. The cross-disciplinary engagement allowed for deep visions that tackled the social, political and economic sphere of society.
- Results from the workshop visions and exploratory research were combined to create tangible visions for a low-carbon Australia and the necessary technological and social innovations that might assist with the transition.

Key insights:

An inspiring example of citizen engagement and creating boundaries around visions. It reinforced the importance of urban solutions: By 2050, cities will be home to 70% of the world's population, account for about 70% of global energy demand and 75% of GHG emissions (Gaziulusoy & Ryan 2017). Cities are hubs for innovation and the creativity necessary to inspire diverse and disruptive models for decarbonization. A network of cities committed to the same transitions may mutually support and cross-fund program investment.

FutureTREC Implications

- Emphasizes the role of systems in the design of participant activities and transition plans.
- Models transition activities that frame tactics for system innovation and how design practices might play a role, to inspire planning processes and suggest tangible next steps (Figure 2).

Figure 1: *Roles of design in corresponding transitions (Adapted from Gaziulusoy & Ryan 2017)*

SENSEMAKING: Mapping Insights to Better Understand Transition

The Multi-Level Perspective (MLP) framework was developed in the early 2000's, emerging in Europe as a means to understand the interaction between actors, environments and innovations within socio-technical systems. This framework explains how socio-technical systems transition over long periods of time (Irwin, Kossoff, & Gasperak, 2020), and attempts to deal with the complexities and resistance to change (Steward 2012).

This framework is used within the field of Transition Design, coined by Professor Terry Irwin, of Carnegie Mellon University. Transition design begins with the proposition that the world must transition towards more sustainable futures and doing so requires a deep understanding of our socio-technical systems, and coordinated systems change. Designers have adapted the MLP framework to identify the spatio-temporal context in which wicked problems emerge (IIT – Institute of Design 2019).

The map contains three levels of context

- **Landscape (macro-level):** This level represents deep cultural patterns, macro-economic developments and deeply rooted norms. Elements within the landscape do not change or are slow to change or represent a rapid external shock. Either way, they apply top level pressure that cascades across the whole system.
- **Regime (meso-level):** This represents dominant rules of scientific, technological, business and market activity. This is a stable level that reinforces the entire system. This level often represents activities that are barriers or enablers of change.
- **Niche (micro-level):** This is the experimental level, for the conception and emergence of new technologies, disruptive ideas and movements that propel innovation.

In a sense-making exercise, we leveraged the MLP to better understand the context of sustainability in Canada, using the tool to map the insights we gained through the literature review process about the evolution of sustainability mindsets, and the contexts within which they emerged. Our goal was to better understand the past and present, in an attempt to navigate towards the future.

The findings chapter contains further insights, informed by the literature and the practical outcomes from the Future TREC Case Study, which are mapped against the MLP framework to socialize how we might transition to new mindsets and approaches to sustainability.

MLP: SUSTAINABILITY IN CANADA (PAST & PRESENT)

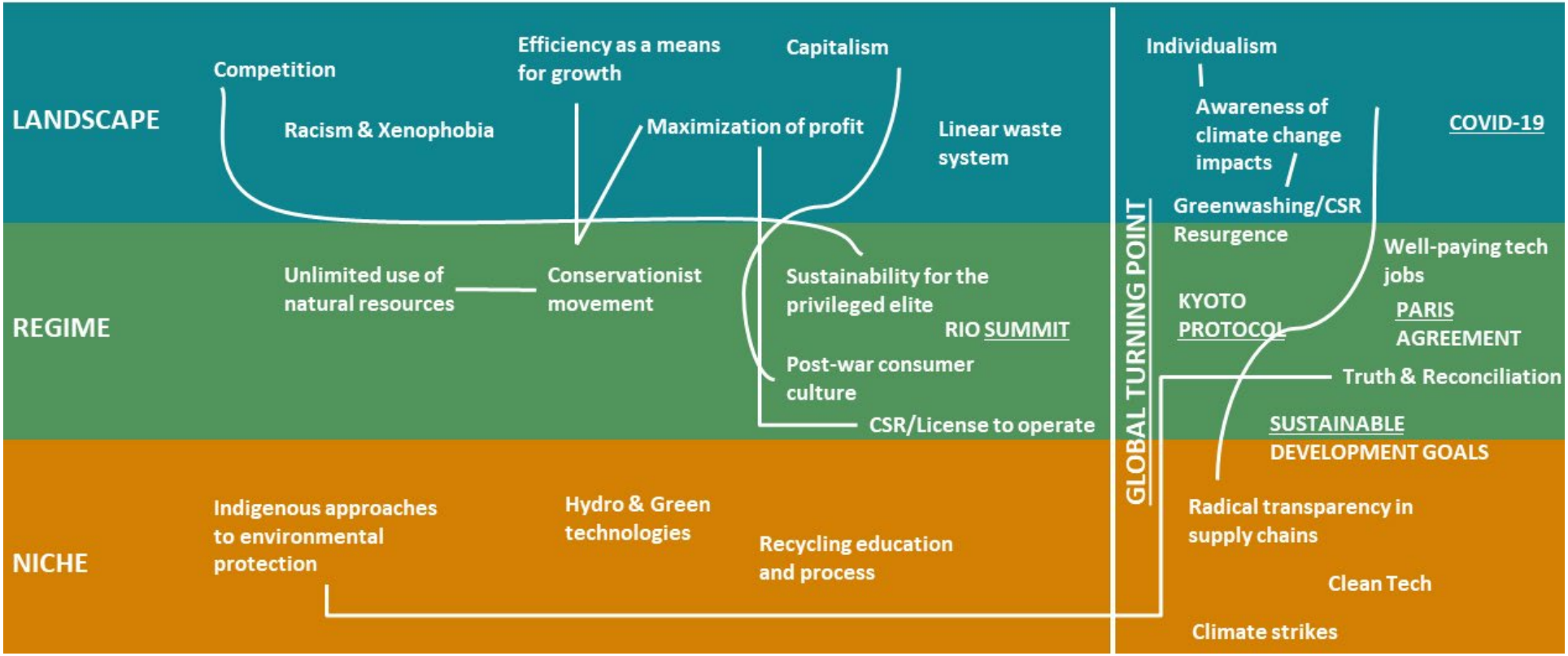

Figure 2: *Multi-Level Perspective Model – Synthesis of Sustainability in Canada Past & Present (Rebello & Black, 2020)*

SUMMARY: Major takeaways and learnings from the foundational research process

As professionals and practitioners working in the sustainability field, the information gained from this project's literature review reflected our own experiences and deepened our understanding of how current practice connects with the historical practice of sustainability. It illuminated emerging approaches to sustainability, within the design for sustainability field and via global climate visioning projects.

Methodologies leveraged by global climate futures projects offered up vital and important elements to be embedded in the design for future sustainability processes, to improve the potential to crack open transformative processes.

- The importance of **context-driven scenarios that keep people at the forefront**
- The **value of systems design** and integrating the creative, technical and political dimensions of our solutions or directions.
- The significance of **facilitating hopeful futures** by supporting participants in letting go of commitments in the now or where they are heading, to simply think of the desired outcome.
- The important task of **enabling knowledge generation and skill-building** by participants throughout the process. By developing an understanding, appreciation and comfort for the uncertain nature of future and ambiguity of possibility, participants are equipped to continue to iterate and build upon their visions of sustainability.

ACTION RESEARCH: FUTURETREC CASE STUDY

ACTION RESEARCH: FutureTREC CASE STUDY

In tandem with the foundational research documented in the previous chapters, we were applying new theory, insights, and frameworks while simultaneously designing and executing a strategic foresight process for non-profit TREC Renewable Energy Cooperative. This praxis-oriented methodological framework addressed the emergent and interwoven nature of the design research project and practical case study. Here we explain why we chose this approach.

Methodology

Action learning is a research and learning methodology designed to be flexible, and to suit changing and uncertain environments (Franklin 1996). Action learning uses a 'praxis'-oriented approach: theory is informed by experience, and experience is subsequently informed by theory. It is an emergent and participatory process; there is no 'formula' that puts forward a method for undertaking a praxis-oriented approach (Arsenault-May 2003). The 'intervention in theory' epistemology of action learning was a good fit for this research project: Knowledge and perspective, as acquired, informed the design of next steps in the execution of a strategic foresight project for TREC.

Action learning is a method that accommodates a range of participants who learn with and from each other. The ontology of action research places value on the knowledge generated by people involved in the problem setting (Franklin 1998). Knowing and learning are based on individual and collective views of a situation and each step of the research framework is designed to collect diverse perspectives of the research situation (Franklin 1996).

Both futures and design are ultimately executed by praxis, learning by doing. Praxis combines the effort to interpret, understand, and apply. It implies that doing – putting an idea or theory into practice – informs the way something is done and what is accomplished (Greenwood 2015). This emergent process of learning by doing unlocks a reflective and creative mindset that lends itself to innovative outcomes.

Praxis creates a supportive 'learning organization' environment in which dialogue from a diverse range of participants is encouraged, and where the process prompts reflection and determination where effort is needed. This approach reinforces the importance of inter-human processes and continued dialogue conducted throughout the organization (Garvin, Edmondson, & Gino, 2008). This is where concrete learning processes and practice emerge.

Overview: Learning by doing

In early 2020, the TREC Renewable Energy Co-op (TREC) intended to conduct a strategic planning process to determine their next direction to propel the clean energy and sustainability sector forward. As a long-time board member, researcher Rebecca Black saw an opportunity. TREC was an ideal research partner: they were value aligned with sustainability best practices and keen to try something new and different, despite a global pandemic which introduced a new layer of complexity to planning. A partnership was formed between the TREC management and Board and the

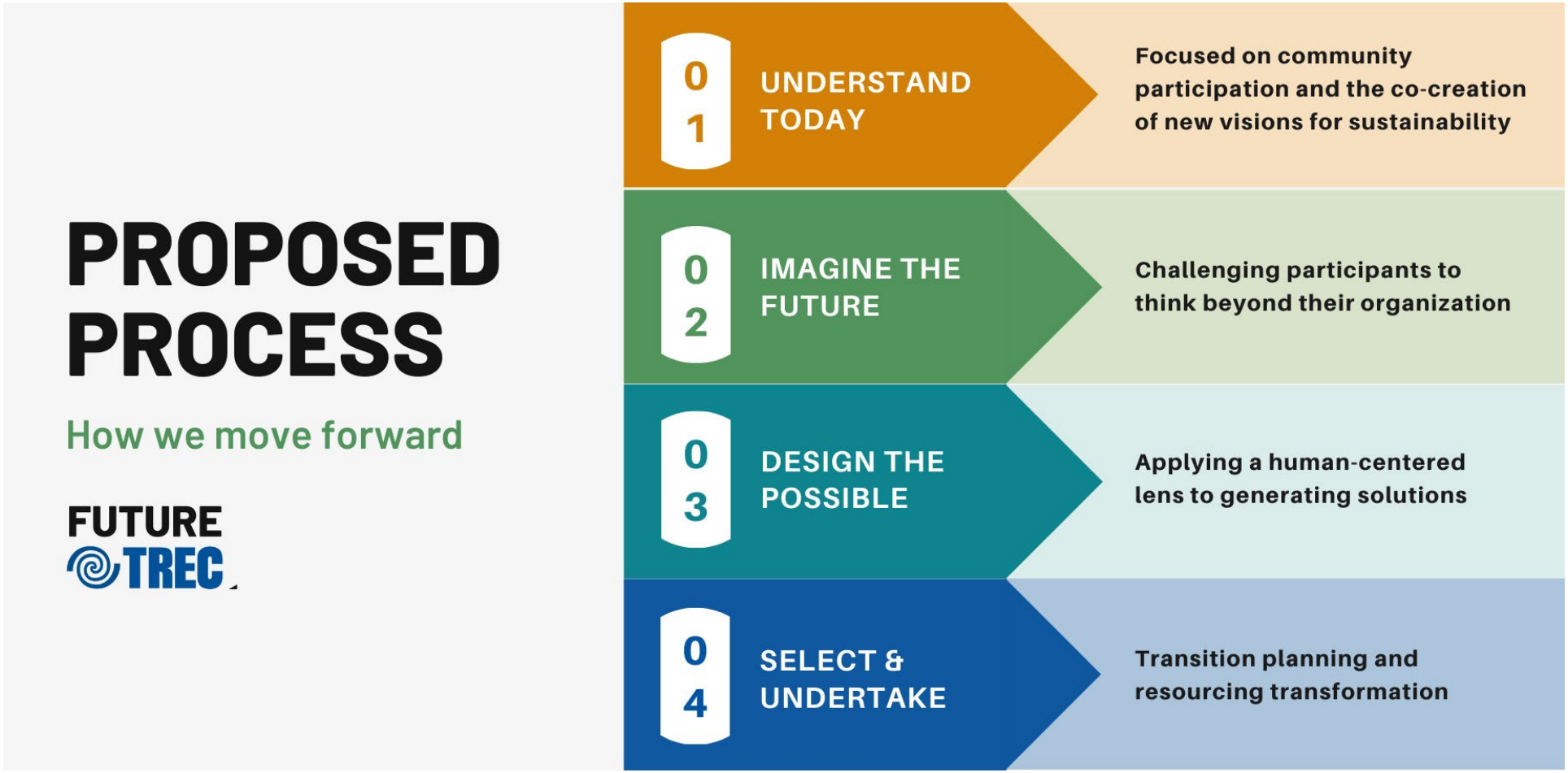

Figure 3: *Four Phases of the FutureTREC journey*

researchers, who would design a planning process that leveraged strategic foresight, and explore its potential to generate transformative innovation strategies for FutureTREC.

In this section, we present the FutureTREC Case study which was completed in partnership with the TREC board and community. We designed a process that would allow for a rigorous application of design-led strategic foresight methodologies in the pursuit of TREC's new plan. This process would simultaneously allow TREC to complete their planning process in a way they deemed desirable, while allowing us as researchers to understand how these frameworks can improve and accelerate the transition to more sustainable strategies and transformations. This section outlines the 4-phase process that was designed to achieve both TREC's goals and our research objectives.

In the design of this process, we considered the constraints we were operating within, including the social distancing public health protocols related to the COVID-19 pandemic. Our participant activities were held in a virtual setting,

which can limit certain levels of dialogue, creativity and engagement (Baum & McPherson 2019). We were working with a team at TREC that was entirely new to strategic foresight as a practice, which meant there needed to be considerable prep work and activity briefing in order to create a sense of comprehension, purpose and buy-in by participants. We were challenged by a lack of age and racial diversity in project participants, both on the TREC board and through invitations to the TREC community. COVID-19 brought an unprecedented level of change and uncertainty to the project, which increased the need for fluidity and flexibility when we were planning and building research activities and supportive materials.

Our goal was to design and execute a process that inspired creativity and spurred participants to make some big but relevant bets on what a sustainable future and strategic direction might look like. In the spirit of an action-learning approach, this was a dynamic process. It evolved with each phase, our iterations based on emerging knowledge from our research, and more importantly the insights and feedback from the TREC participants. This section breaks down each phase, showcasing which tools were leveraged and some of the outcomes for TREC.

PHASE 1: UNDERSTAND TODAY

01

Phase 1 was a process of boundary setting and community engagement, with the goal of co-creating TREC's vision for sustainability in the future. We explored five opportunities spaces that meaningfully connected to TREC's strengths and current capacities, reflected current innovations within the sustainability sector, and responded to current uncertainties facing Canadian society.

TOOLS

Literature review and environmental scan: Building knowledge to better understand and assess opportunities and context

Community survey: Reaching out to key stakeholders to garner their perceptions, ask their input, and gain insights to inform decision-making

PROCESS & OUTCOMES

A scan of the headlines provided a compelling snapshot of what was important to communities in Canada during the research project: the economic recovery from an ongoing pandemic, social justice for marginalized people, concern about the growing impacts of climate change. Where might the opportunities be for TREC to build upon its considerable strengths and experience, to find a unique and meaningful place to add value?

The TREC Board nominated a management team to sponsor the strategic foresight planning process. Their role was to help guide decision-making and boundary setting for the project. The process of boundary setting was developed using the designer's toolkit for innovation, and this step identifies possible visions of sustainability for TREC that have

- **Desirability:** What makes sense to people and for people?
- **Feasibility:** What is technically possible within the foreseeable future?
- **Viability:** What is likely to become part of a sustainable business model? (IDEO 2015, 15)

Through this guided discussion, five viable, desirable and feasible opportunity areas were identified: driving the circular economy; improving lives in our cities; promoting local energy independence; facilitating inclusive communities and building community economic resilience.

These are spaces in which TREC might execute their vision of sustainability and create impact through low carbon, socially inclusive solutions at the community level. A literature review and environmental scan yielded a clear definition for each opportunity space (See Appendix A).

Opportunity Areas for FutureTREC

Driving the Circular Economy

Educate, advocate and incubate inspirational projects that help decouple local economic growth from the consumption of finite world resources

Improving Lives in our Cities

Create breakthrough urban experiences by leveraging democratic, collaborative, community-building financing, tools and systems

Promoting Local Energy Independence

Accelerate our transition to a zero-carbon future through locally owned, community-scaled energy projects

Facilitating Inclusive Communities

Amplify and prioritize projects led by members of underserved communities including youth

Community Economic Resilience

Help our communities thrive in the face of unprecedented challenge, through local investments in projects that promote sustainability and foster local job growth.

The five opportunity areas and definitions were introduced to TREC's community by means of a community survey designed to engage more diverse perspectives on possible next steps for TREC (see Appendix A). Survey respondents, representing TREC key community partners, industry experts, board and staff team, were asked to rank the opportunity areas based on their understanding and enthusiasm for inherent opportunities in the spaces, and their opinion of TREC's legitimacy to play in these areas.

When asked to rank opportunity areas for biggest potential positive impact over the next 10 years, 'building community economic resilience' was the clear leader while also earning high ratings in terms of TREC's credibility in this space.

Community support for 'building community economic resilience' included these quotes from the survey:

- 'Rebuilding the economy post-pandemic is priority #1 – but it needs to foster local jobs and local ownership of sustainable projects and enterprises.'
- 'The top down "economy-of-scale" approach (where bigger is better) has to transition quickly to a 'bottoms-up' network of interconnected communities (where local priorities are what matter) that are sustainable.'
- 'More community-owned projects that create jobs, enhance resilience, reduce carbon and build community capacity will generate increased momentum for further opportunities and action.

TREC's Vision of Sustainability: Community Economic Resilience

With Community Economic Resilience selected as a viable, desirable and feasible opportunity area for FutureTREC, the TREC Board collaborated on a definition that reflected their collective insights. The 'working definition' that the group landed upon was this:

Resilient local economies are those that can provide fulfilling livelihoods and create emotional cohesion within a community of people, who are using their fair share of resources to generate a range of community assets and transaction types – personal, economic and governmental – that build the capacity to move forward sustainably in response to short term shocks and long-term changes, whether they be ecological, social and/or economic.

And with that milestone accomplished, the strategic foresight planning process for TREC was underway.

PHASE 2: IMAGINE THE FUTURE

02

Phase 2 explored current trends and drivers of change, mapping them to generate potential futures. A 2 x 2 matrix tool was chosen to map the trends and build future worlds and populated through a two-part workshop series. Engaging a cross-section of TREC Community partners, board members, and staff, the process sought a wide variety of perspectives and vantage points. This phase applied a systems lens to the problem space and was designed to push participants outside of what they already knew into new spaces.

TOOLS

Horizon Scanning: The horizon scanning process involves sourcing information about external forces of change that are affecting the opportunity area. This process provides a better understanding of the ecosystem in which possible sustainability strategies may exist, and explores the trends which could accelerate or prevent the transition toward sustainable business models.

A comprehensive and diverse range of trends help to generate unexpected and less biased visions of the future. A well-constructed trend portfolio includes items that span diverse aspects of social life, technology, ecology, economics, politics, and values.

Three layers of information coalesce in horizon scanning:

- **Fads:** Cultural notions with brief lifespans of <2 years
- **Trends:** Signaled by events, policies, relationships and operate over a 3 to 8 years
- **Drivers:** Longer-term underlying forces of change that push trends into the future

Participatory workshop – 2 x 2 matrix:

A 2x2 matrix was chosen for this project, as it was well suited for high-level analysis and the project's 10 year timeframe. Our collected trends were plotted against two axes representing two critical uncertainties, forces which are essential to the focal issue but are widely variable and hard to predict in terms of which way they could go. The results of this exercise were four very different, but plausible, scenarios. Each of these quadrants is a logical alternative future that can be explored (Wilkinson 1995).

New, outside and different views are included and celebrated in storylines which 'scaffold' the ideas and views to give shared meaning to divergent views. This scaffolding of insights about an environment is designed to unearth and articulate tacit knowledge (Van der Heijden 1997, 5). The variety of ideas reflect the uncertainty in which organizations find themselves, and in which context the strategic direction will have to evolve (Van der Heijden 1997, 30).

PROCESS & OUTCOMES

This phase of our research focused heavily on the people, environmental influences, policies and events that might have a critical influence in Future TREC. Trends were selected to reflect activity within the opportunity areas (for example, trends in the circular economy), as well as widespread trends like the COVID-19 pandemic that were affecting large-scale social and environmental change. The resulting package included over 40 diverse trends spanning the STEEP-V (Social, Technical, Economic, Ecological, Political and Values) spectrum. These were packaged for workshop participants to review in advance of the workshop series.

Plotting trends: Developing the 2x2 matrix

The 2x2 matrix model was a straightforward way to organize information and a good introductory tool for workshop participants who are unfamiliar with foresight practices. The 2x2 graphic was easy to manage in a digital format, accommodating the COVID-19 pandemic necessity of social distancing and digital participation in the workshops.

To select critical uncertainties for the trends mapping exercise, trends from the horizon scanning exercise were grouped by their underlying causes, those that are slow-moving and longer-lasting. This exercise unearthed the more deep-seated drivers of change, which were ranked by level of uncertainty and potential impact on TREC.

The critical uncertainties that were ultimately selected as the most impactful and variable were

- The pace of economic recovery in Canada (fast/slow), and
- The government's response to decarbonizing the economy (quick to adapt/slow to change).

A 10-year time frame was chosen for the exercise. The modest time frame reflected the needs of TREC, the pace of change, and it also aligned with the Paris Agreement to reduce greenhouse gas emissions by at least 40% by 2030 compared to 1990 (UNFCCC 2016).

In a digital workshop format, a dozen participants from the TREC community gathered on a Zoom call to start building FutureTREC. Split into two groups, they were led through a facilitated exercise to populate half of the trends on the 2x2 matrix collaboratively and encouraged to contribute other trend ideas and counter-trends.

Questions used to guide participants and help them plot the trends on the matrix included:

- If this trend were to persist over ten years, in which quadrant would it be most likely to thrive? Why?
- Consider the critical uncertainties. How does each of them interact/impact this trend? Which has a more significant impact?
- What kind of engagement would be needed from each of our critical uncertainties to bring the trend to its most impactful fruition?
- Are there any other quadrants that this trend might show up in?

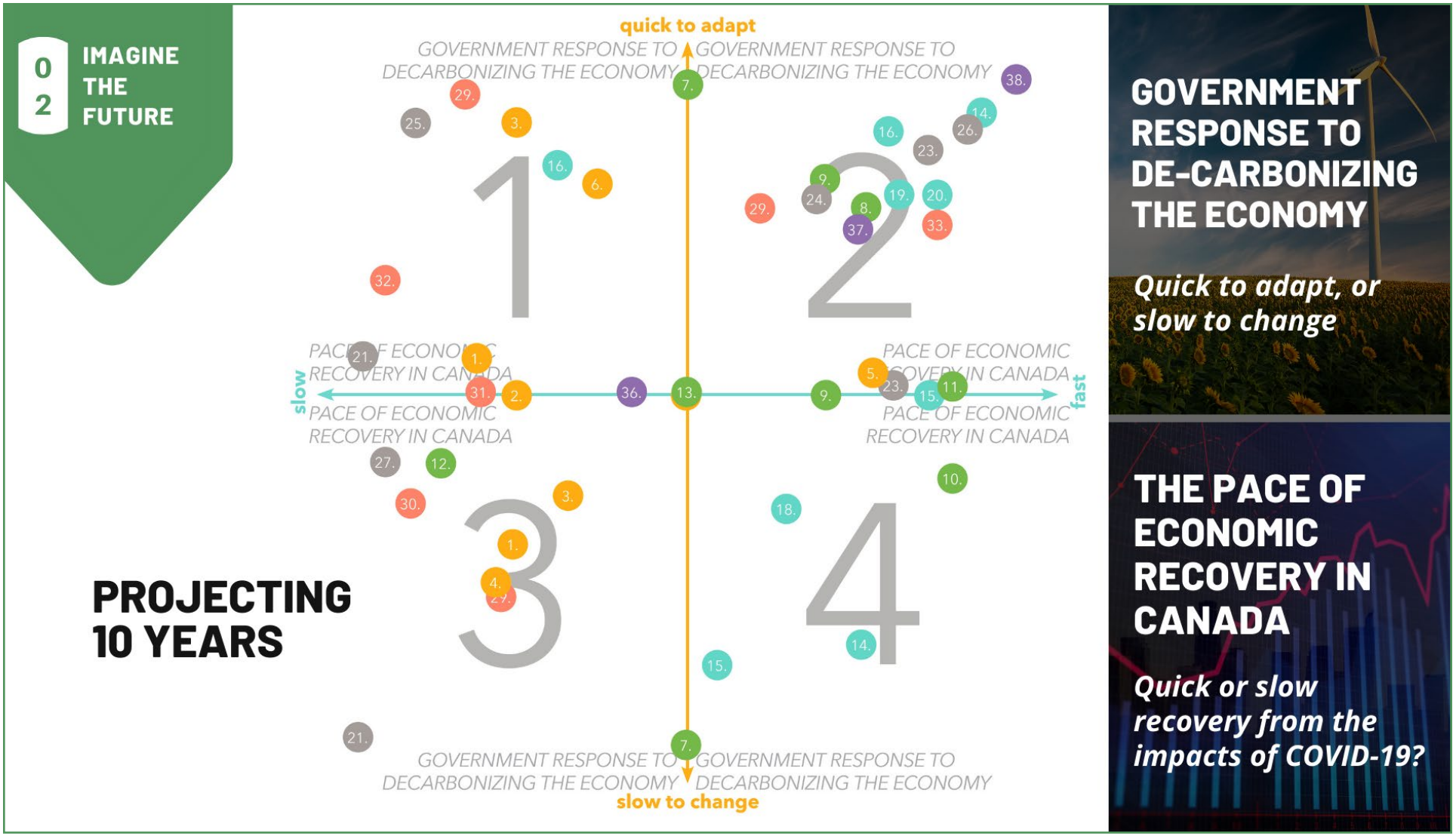

Figure 4: *FutureTREC Trend Plotting Workshop Worksheet*

Scenario Development

The Scenario Building workshop built upon the results of the trend plotting exercise to build out the four distinct narratives of possible futures. Participants helped populate a quadrant, by discussing the plotted trends and their impacts on different industries and aspects of social life.

Earlier research illustrated the impact of trends was highly variable at different levels of population density: high density (urban) communities experience trends differently than medium (suburban) and low (peri-urban and rural) density communities. Given the importance of community on the process for FutureTREC, the group was asked to select a specific density for the scenario building exercise.

Separated into two groups, the groups focused on the trends and uncertainties in one quadrant and explored possible dimensions of future worlds:

- What might social life be like?
- What might be some dominant technologies?
- What is the state of the environment and economy?
- What political drivers or issues have arisen?
- What value systems are being displayed?

The results generated by the group discussion were further explored, built out and upon by the researchers.

The end result was a set of four compelling and descriptive briefs composed of several paragraphs and images that capture and articulate key themes of different and distinct FutureTREC scenarios, spurring the imagination of the reader and providing a fertile alternative world in which to play. A catchy name bonded the scenarios together and further built the set for the imagination to explore (Flowers 2003).

Figure 5: *FutureTREC Four Final Scenarios Overview Slide*

1 – Stable but vulnerable – A country with a slow-moving economy but quick response to climate change, we see the government rely heavily on social policy like Universal Basic Income to ensure the economy stays stable and regulating industry regarding carbon. We are seeing a range of local, community-focused initiatives supported by these policies.

2 – The Green New Deal gets real – Quick economic recovery and dedicated government response to climate change see generous incentives for private sector capital, boosting a Made in Canada approach to an economy fueled by green tech. Canada welcomes climate refugees who join 'blue-collar' workers to fill government-funded jobs in climate mitigation.

3 – Fight or flight – Slow economic recovery, low government response to climate and carbon: society is in a reactive mode as people scramble to protect their resources. In instances of social or environmental calamity, low-tech, local and community-focused initiatives help people make do, but some people are being forced to migrate within Canada. There is an active sector of the population who are anxious and angry, including many youths.

4 – People over planet – Quick economic recovery, slow government response to climate and carbon: The world's leading economies have moved on from carbon, but Canada committed to propping up legacy extraction industries. The economic recovery has been real, but it is unsustainable. The impacts of climate catastrophe are unmitigated, heightening the risk gap between rich and poor, and severely limiting options for who used to be known as 'middle class'. Many people have turned inwards and online to find community.

PHASE 3: DESIGN THE POSSIBLE

03

In this phase, TREC participants used the completed scenarios to explore how TREC might evolve, the problems they might be solving, and how their main stakeholders might be affected by the conditions of each world. This stage emphasized the need for human-centred solutions, ensuring that ideation started with individual stakeholders before moving on to organizational and societal levels.

TOOLS

Personas: Creating reliable and realistic representations of key actors who are involved in the opportunity area helped situate workshop participants in possible futures, while intentionally integrating more diverse representation into the problem seeking process.

Customer journey mapping: Design thinking uses a human-centred design approach to develop empathy for key actors, to understand what problems end-users (customers or community) might be trying to solve before attempting to design solutions for them. This approach focuses on the end-user to generate innovative and unexpected ideas and strategies.

Expert interviews: Sourcing diverse perspectives and insights from experts in community building informed the development of inclusive and provocative personas and scenarios.

PROCESS & OUTCOMES

With scenarios in hand, the process entered an ideation and design phase. How might these scenarios become useful for setting strategic direction and creating meaningful strategies? Who is going to be in these scenarios, and why would they care? It is at that point in the process that design thinking was applied. This phase began with a series of expert interviews, each meant to further develop the FutureTREC scenarios and a set of composite personas.

With a lack of diversity on the TREC board, and a desire to support those disproportionately impacted by climate change, we needed additional voices at the table. Our expert interviewees shared perspectives on the impact of our critical uncertainties on their direct stakeholders. These included homeless racialized youth, social entrepreneurs, and indigenous communities. These perspectives supported the design of a set of composite personas that would act as the key stakeholders or participants with whom TREC aimed to serve and collaborate.

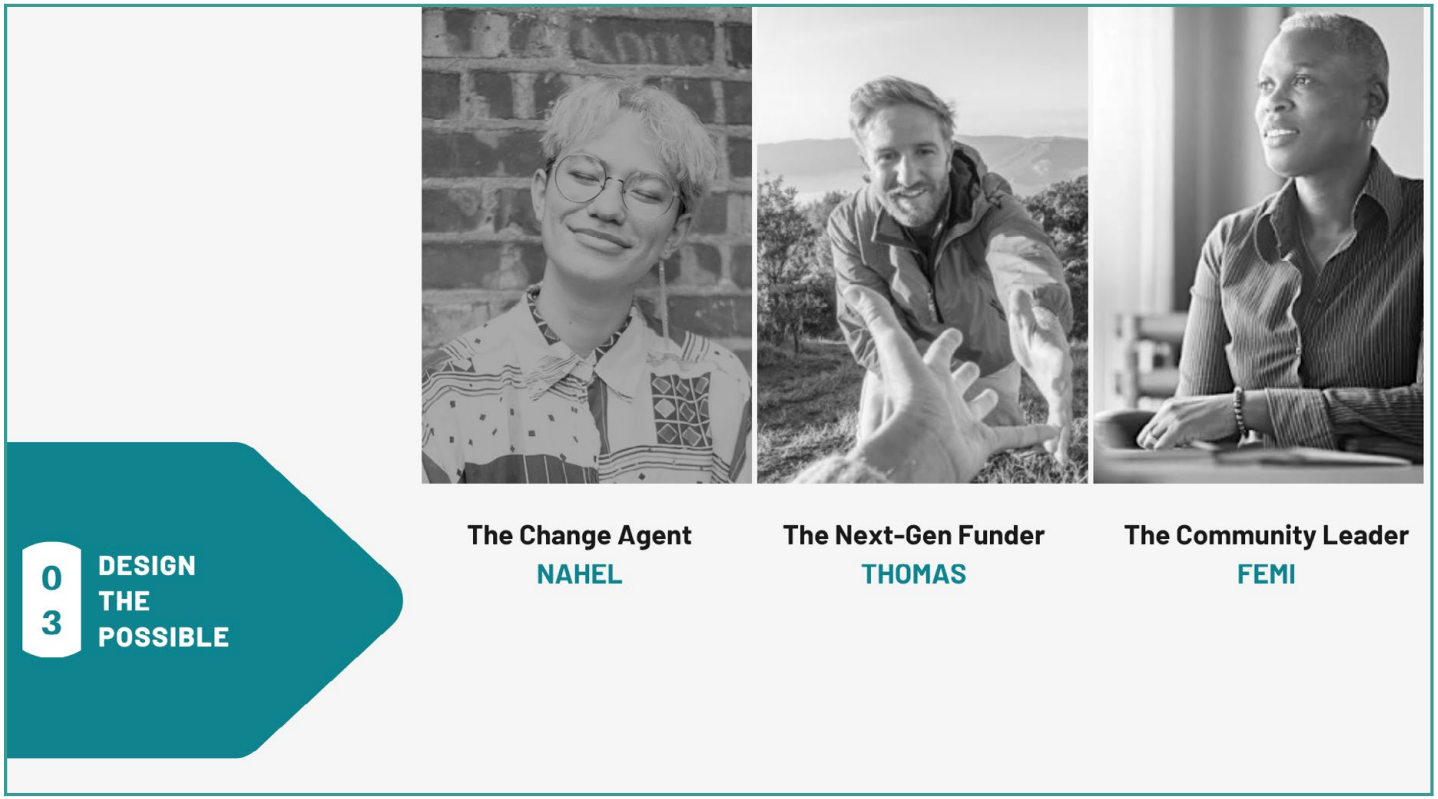

Figure 6: *FutureTREC Hero / Actor Profiles*

The three personas that were developed to encompass key attributes of stakeholders in community economic solutions were:

- The Activist Change Agent (LGBTQ, social entrepreneur, Gen Z in 2030 = 18 – 33 years old)
- The NextGen Funder (plays a funder role, Millennial in 2030 = 34 – 49 years old)
- The Community Leader (active in their local community, with local issues, representing a disadvantaged group)

Developing opportunity areas for Community Economic Resilience

With the potential to cut across all sectors and aspects of the economy, we worked with the TREC management team to focus the team on three key opportunity areas where TREC has high credibility and potential for creating successful strategies:

- **The built environment –** opportunities like co-housing, re-utilizing buildings and spaces, and other ways in which sustainable value can be built at the community level
- **Energy –** including renewables also beyond renewables, to consider district and community-scale systems, retrofits & other distributed energy solutions that might power resilient communities.
- **Community-based economic systems –** participatory economies like sharing and trading solutions, community ownership and finance, circular strategies.

Ideas Generation Workbook for FutureTREC

Armed with four futures, three actors and three opportunity areas all of the high relevance for Future TREC, we designed a workbook outlining a step-by-step exercise that allowed participants to generate multiple pathways towards their vision of community economic resilience.

The workbook began with a simplified customer journey map (see Figure X), which allowed participants to build empathy and understanding of the social contexts of their selected actors. Each participant group was provided with a future world to build their pathway or strategy. With a greater understanding of their actor, participants were asked the following questions;

- What kind of problems is your actor trying to solve?
- Which of our opportunities spaces might help solve/ support them? How?
- For one of their ideas generated –
  - Describe what this strategy or solution looks like? Is it a policy, program, product or service?
  - What other stakeholders might be involved?
  - How might TREC participate in this solution? What unique value might TREC bring?
  - How might this solution accelerate the mission and vision of TREC?

The sequence of these questions allowed participants to uncover a network of opportunities for TREC, further connecting TREC with the communities they wish to serve. By leveraging a human-centred approach, TREC can link their strategic direction to the needs of communities in the future. We encouraged TREC to place this strategy or solution in context of the stakeholders it impacts, as well as the conditions of their scenario.

To ensure that the workbook and exercise were straightforward and seen as valuable to our TREC participants, we shared the process in detail with them, providing them with a completed example as inspiration, and a recorded instructional demonstration.

Working in pairs, the TREC board completed the workbooks and submitted four unique ideas. These ideas combined a human-centred approach with the collective knowledge and expertise of the TREC board. The worksheet gave them the capacity to think outside of the TREC ecosystem and skillset but remained within their set of values. The scenario package provided rich information and detail on their future worlds, including the trends that are most prevalent in shaping the world and the impacts of the critical uncertainties. While the strategies themselves would not represent a future direction for TREC specifically, we brought the group together to discuss and wind-tunnel the ideas against the other worlds. These ideas continued to evolve, and with that, the potential actions for FutureTREC. Each of the activities was captured for the final stage of our process. Figure X shows a high-level outline of the TREC solutions spaces, with the resulting activities and workbooks retained by TREC.

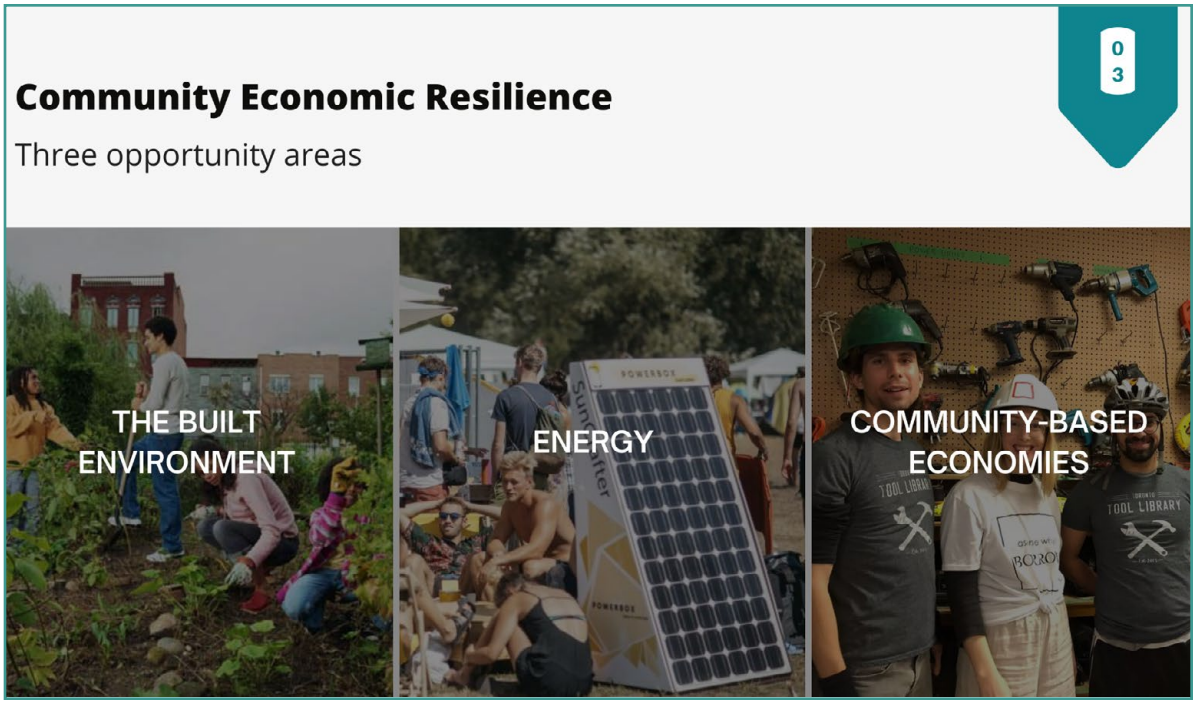

Figure 7: *FutureTREC Opportunity Areas for Community Economic Resilience*

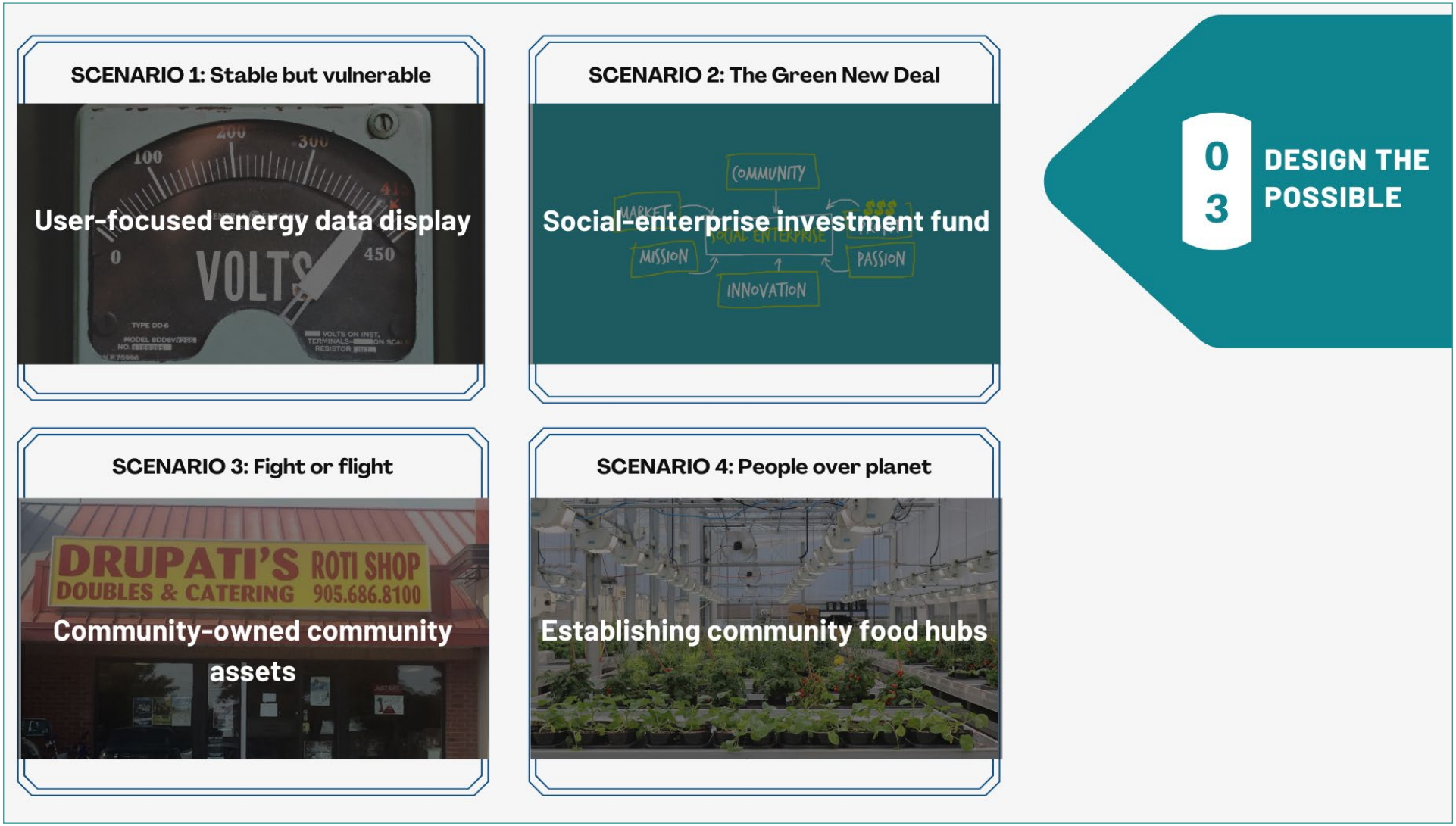

Figure 8: *FutureTREC Ideas for Community Economic Resilience*

PHASE 4: SELECT AND UNDERTAKE

The final phase of the project brought the focus back to TREC: Which of the ideas and strategies put together by project participants aligned best with their innovation ambition? Which best helped to accelerate TREC towards their vision of a sustainable and resilient future? The goal for this phase was to support TREC in articulating their innovation ambition and creating a sustainable and manageable portfolio of innovative ideas. Using an innovation strategy framework, we sorted the ideas and discussed how TREC might transition towards desirable strategic directions.

TOOLS

Innovation Ambition Matrix: A tool refined from the classic management diagram by H. Igor Ansoff (See Figure 9), in which the x-axis measures the novelty of the company's offering, and the y axis measures the novelty of its customer markets (Nagji and Tuff 2012). This matrix helps to organize the diverse set of activities and draw connections between them. The authors share that an organization will manage total innovation if they can clearly state their innovation ambition, strike a balance between their set of activities, and resource them appropriately.

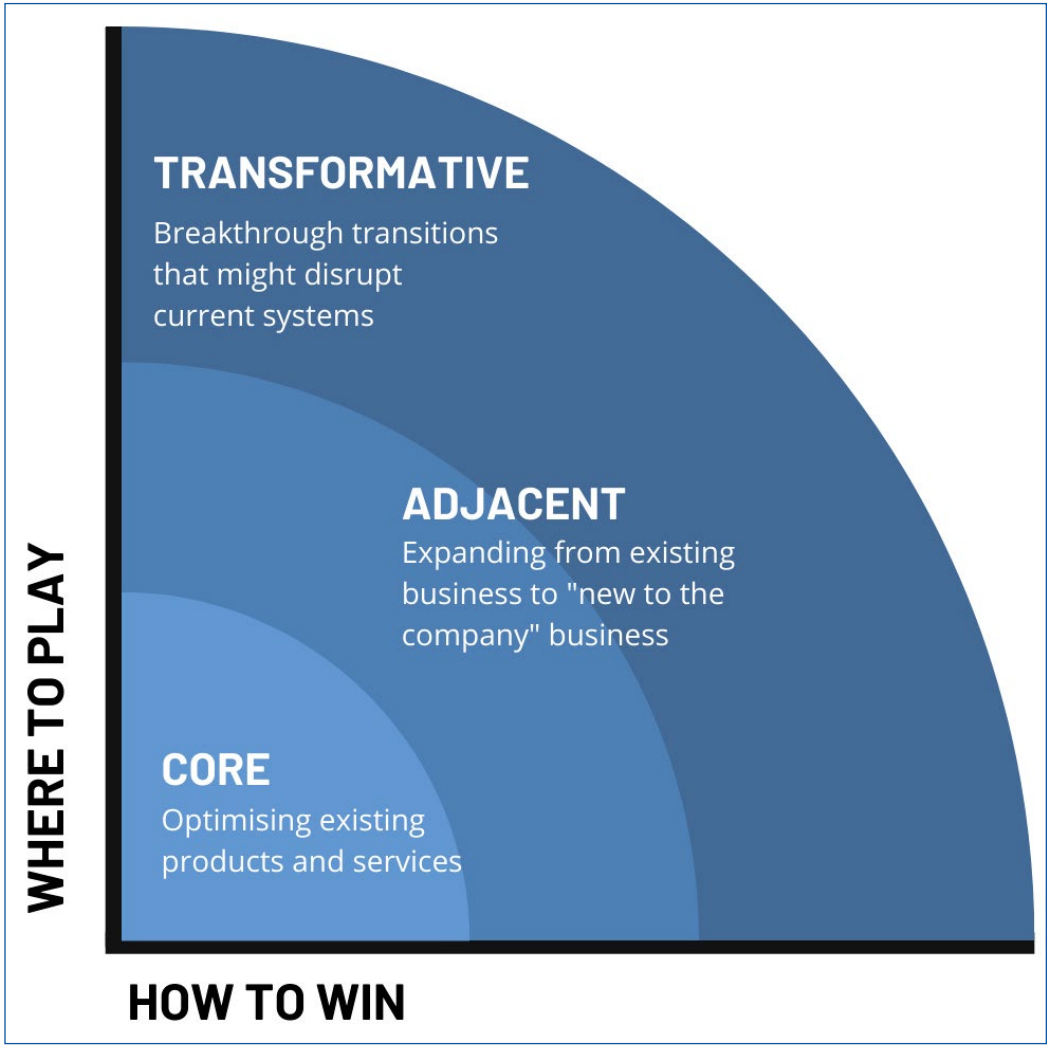

Figure 9: *Adapted from Monitor's Innovation Ambition Matrix (Nagji and Tuff 2012)*

PROCESS AND OUTCOMES

The final phase centred on taking the ideas and conversations from our participant work and selecting the activities that best aligned with TREC's vision for community economic resilience. Our goal was to prepare the board to set out an agenda that struck a balance between

1) **TREC's core strengths** – an action that created incremental innovation within existing programs and inroads into similar opportunity spaces.
2) **Extended or adjacent actions** – activities that involved leveraging TREC's core strengths in a new market
3) **Transformative opportunities** – actions that accelerate towards the resilience communities we envision but requiring significant change on the part of TREC

To explore this activity, we prepared a final deliverable which organized each of the ideas and strategies using the Innovation Ambition Matrix framework. We led a facilitated discussion with the TREC board to address where TREC would hope to place their big bets, and how they might protect their blind spots with an innovation portfolio approach to strategic planning.

The goal for this final deliverable was to prepare the TREC board to move into a prioritization process. Using the skills, knowledge and tools from the entire strategic foresight process to inform this activity, they enter the process understanding not all activities need to be pursued at the same time, and there must be appropriate management structures in place.

We presented management considerations for building a sustainable innovation portfolio, drawn from the Harvard Business Review article written by the leaders of global innovation practice at Monitor (Nagji & Tuff 2012).

- **Talent:** What are the skills needed for you to execute your portfolio? How much talent investment is reserved for core and adjacent initiatives? What resources are allocated to keep your transformative initiatives moving?
- **Integration:** How are you organizing your teams? How are the teams working on your core, adjacent and transformative actions working and learning together?
- **Funding:** Where will you prioritize your funding? Are you able to sustain your transformative activities?
- **Pipeline management:** How are you tracking progress? Are you able to revisit the scenario process to explore how they have evolved or changed?
- **Metrics:** How are we measuring success? Can we decide on the scope of each major initiative and initial goals?

TREC's innovation portfolio included a complementary set of core, adjacent and transformative initiatives drawn from their work and ideas, and the participants were armed with the right tools and capabilities to manage these parts of an integrated whole. While the final prioritization was outside of the scope of this research, we completed a final outline of the process and an example of the process in action.

OUTCOMES: INSIGHTS AND DESIGN PRINCIPLES FOR TRANSFORMATIVE INNOVATION TOWARDS SUSTAINABILITY

OUTCOMES: Insights and design principles for transformative innovation towards sustainability

Practitioner Learnings

Leveraging foresight tools for sustainability

We were very grateful for the opportunity to work with TREC, and for their overwhelmingly positive feedback about the strategic foresight process and their experience. As researchers, designers and practitioners of strategic foresight for sustainability, our impact will arguably only be as strong as our ability to engage organizations that want to discover transformative innovations and enable them to have meaningful experiences that generate exciting and actionable results.

The FutureTREC project put this premise to the test. Execution matters. As we navigated the FutureTREC project, we gained key insights at the design, delivery and reflection stages that improve the potential for positive impact and meaningful outcomes of this type of strategic foresight project. These learnings informed the following chart of design and execution principles, organized around the chronology of the FutureTREC project. Our wish is that these will prove useful for other designers and facilitators of strategic foresight for sustainability.

Table 2: *Practitioner learnings gained in each FutureTREC phase*

Case Study Phases	Practitioner Learnings
01 UNDERSTAND TODAY	● **Inclusivity starts here:** Including diverse participants from the start leads to better design and opens up a greater range of creative possibilities. Building diversity into the process after the fact results in ideas, future scenarios, and opportunities that do not reflect multiple perspectives and experiences. It is challenging to break those ideas down once they are already in place. We conducted interviews to gain and integrate different perspectives, and designed what we heard into project elements such as scenarios, personas and solution spaces.
	● **Participants are the designers:** Facilitators need to move their ego out of the way so participants' tacit knowledge can emerge and flourish. This approach produces solutions and processes that are authentic, transparent, hyper-local and unique to the people involved in the process.
	● **Scoping sustainability is an ongoing process:** Against the backdrop of TREC's vision for sustainability, we continued to challenge the definition of communities, neighbourhood, local. We viewed sustainability as a wicked problem, discussing the interconnectedness of each opportunity which helped to surface new visions.

Case Study Phases	Practitioner Learnings
02 IMAGINE THE FUTURE	• **User-friendly and focused tools and techniques**: Especially when doing something new, and in a digital format, communication and workshop tools need to be incredibly clear in explaining the 'why' and the 'so what' of every step of the process: effort in this regards improves buy-in, enthusiasm and engagement.
	• **World-building in the time of COVID-19:** It was challenging to select relevant trends in the face of such volatility. In the FutureTREC project, this process would have benefited from several iterations, more robust community perspectives, and the luxury of a longer workshop period.
03 DESIGN THE POSSIBLE	• **Preconceived destinations:** Passionate participants may come to the table with their own visions, their own ideas and projects. It is challenging to let go, to disconnect from current sustainability practices and embrace an unknown future. In this project, we saw these types of instincts and habits, and saw some shift. This is something to reckon with and design into the process, leaving time to pull apart pre existing solutions.
	• **Pivot back to people:** Take a human centred design approach to create personas who resonate with participants, generate empathy and drive engagement and imagination
	• **Lead by doing:** Model creativity, ingenuity and courage to think outside the box by providing an example
	• The power of the group: Design in opportunities for collaboration between participants to help spark ideas and energy, team dynamics and accountability
04 SELECT & UNDERTAKE	• **Structure matters:** We recognize that the type of organization that embarks on a strategic foresight journey will affect the outcomes. Working with a non-profit coop like TREC means working from their values and governance structure. A for-profit corporation would start from, and no doubt end up in, a different place.
	• **Improving Accessibility:** For a sector that is resource constrained, how can we make foresight accessible and sustainable? How might the tools and capacity be improved, to maintain this type of work over the long term and improve the impact of the approach. / embed it into their process / one-off foresight is not helpful
	• **Scoping transformation is difficult:** In this research project, we got to innovative ideas but real transformation is only measurable once strategies are acted upon. So TREC has a portfolio of opportunities, but we're not in the position to measure impact or transformation at this stage.

5 Design Principles powering Strategic Foresight for Transformative Sustainability:

Guided by our research and sense-making process, we have developed five design principles that can act as valuable guideposts when designing and executing strategic foresight processes for transformative sustainability.

Table 3: *Design Principles for the use of foresight methods in sustainability*

1. THE PROCESS IS COLLABORATIVE

Designing in pervasive collaboration opens space for participants to co-create new visions while reframing individualistic or competitive approaches to solution-making, and to move beyond incremental and the "less of the same" mentality by leveraging collective creativity to re-think current systems of doing and making.

2. THE PROCESS IS HUMAN

Building in the human centred design principle of empathy – for participants in the strategic foresight process as well as future actors, scenarios and solutions spaces – unearths unmet needs which drive creative and unexpected solutions that solve problems at the human and community level.

3. THE PROCESS EMPOWERS INTERSECTIONALITY

Opening space for all voices in inclusive and equitable design begins to reckon with the systemic oppression and discrimination that exists within institutions and resulting climate action plans, in an effort to ensure these oppressions will not be re-inscribed into unsustainable and inequitable solutions and visions for the future.

4. THE PROCESS REWIRES HUMAN SYSTEMS

Focusing on product-service innovation restores individual and collective agency, and moves away from an over-reliance on breakthrough technology to solve social and ecological challenges. By focusing on new ways of doing and making, we can accelerate the shift to a circular economic model that helps decouple local economic growth from the consumption of finite world resources.

5. THE PROCESS SHIFTS NORMATIVE CULTURE

Reframing the nature of community beyond geographic location, to consider community-focused networks of social innovations serving local needs, can build and strengthen a process which enables participants and organizations to collectively be resilient and optimistic in the face of pervasive change.

CONCLUSION

In this concluding section, we'll discuss the ways in which the research project addressed the research question, new considerations that emerged as the action research process unfolded, and opportunities for further research at the intersection of design, strategic foresight and sustainability.

Let us restate that the climate crisis is a wicked and urgent problem. Our research leveraged Irwin's Multi-Level Perspective Framework (MLP) tool (Irwin, 2015) to map and deepen insights about the interconnected legacy mindsets, economic and social frameworks which promote incremental change: these are slowing the transition to a low carbon, socially equitable future (see Figure 3). Conversely, the literature review also unearthed new, inclusive and transformative ways of envisioning and designing for sustainability, and rich areas of opportunity for sustainable solutions (see Appendix A). As a sensemaking exercise, we turned again to Irwin's MLP framework to organize key insights from the literature and the insights gained while designing, facilitating and executing the FutureTREC strategic foresight process (see Appendix D). The exercise synthesized the collective outcomes of the research project, and provided a pivot to future mindsets and cultural patterns that might support the transition to a sustainable future, the market and business forces that might enable change, and disruptive technologies and programs that are percolating.

Our research question was, **How might sustainability-focused organizations use foresight methods to move from incremental change to transformative sustainable strategies?** The research process generated two distinct outcomes which address the question.

The first is a list of practitioner learnings (see Table 2) that was generated from the researchers' key insights at the design, delivery and reflection stages of the FutureTREC project and case study (see Appendix D). The second is a set of design principles (see Table 3) that can act as valuable guideposts when designing and executing strategic foresight processes for transformative sustainability: design a process which is collaborative and human, that empowers intersectionality, rewires human systems, and shifts normative culture.

We encourage foresighters and designers to consider the learnings as practical guidelines and suggestions which can improve the potential for transformative sustainable outcomes for strategic foresight projects.

Future Opportunities for Design, Foresight & Sustainability Research

Our research journey, and the feedback of our case study participants, suggest that strategic foresight and design tools are indeed useful for sparking innovation for positive impact contributing to a sustainable and inclusive world. However, as stated at the onset of this report, we recognize that a limitation of our research was the pro-sustainability bias of the organization that participated in our case study, as well as our bias as sustainability practitioners, researchers, and designers.

Acknowledging the need for change at all levels, and for the participation of diverse sectors in designing new and transformative visions of a sustainable future, we propose three ways in which future research could support the engaged, address gaps, and create valuable cross-sector opportunities for the use of design methods and strategic foresight to spur sustainable strategies.

1. Improve accessibility to foresight within the social impact sector – a toolkit that fits the context

The social innovation ecosystem in Canada targets widespread positive social and environmental change however many social innovators operate with constrained resources. Further research to pressure-test design principles and more deeply understand sector needs could inform the development of an open-access toolkit specifically for social impact entrepreneurs and organizations, to spur the understanding and uptake of design and strategic foresight tools to future-proof their strategies and innovations.

2. Co-lab model for sustainability that brings new partnership and collaboration opportunities

How do we bring these new visions to life? Tackling new ways of doing and making will require new ways of partnership and collaboration. In an increasingly complex and uncertain world, restructuring socio-technical systems will require new approaches to growth and competition. While our research centered on a single organization designing for their preferred vision of sustainability, how might a group of organizations come together to co-create a vision and develop strategies that are mutually beneficial? A co-lab is a multi-party partnership, where each of the actors work together to tackle a problem.

3. Executive training or education for sustainability teams to rethink industry orthodoxies

Sustainability teams work within larger organizational constructs and cultures, and as such, can be constrained by traditional strategic planning processes and long-held business orthodoxies that block the uptake of new approaches and fail to deliver innovative and competitive solutions (Mintzberg 1994, Porter 1996, Van der Heijden 1997). Potential tactics to help shift mindsets of corporate leaders and board directors towards the awareness, consideration and adoption of design and strategic foresight tools for sustainable innovations include: targeted research, outreach and executive education; the publication and dissemination of methodologies and facilitation materials in management media channels; and training up experts that organizations can easily and quickly tap into to broaden the set of voices at the strategy and innovation table.

Final thoughts

During our research we discovered designers and practitioners of strategic foresight from around the world who are meeting the immediate need to spark transformative innovation to address pressing challenges. They are designing and executing processes that are generative, participatory and optimistic, unearthing participants' deepest knowledge and insights, inspiring them to collaboratively build and consider possible futures, and opening spaces to innovate informed and insightful new solutions by which positive change and impact can occur.

As sustainability professionals committed to creating sustainable solutions, we are excited to contribute this research project, design principles and suggested opportunities to the growing and evolving field of design and foresight for sustainability.

For foresighters and futurists, we hope the Insights and Design Principles powering Strategic Foresight for Transformative Sustainability are useful and thought provoking pathways that help 'design in' sustainability for all of your important work.

For sustainability practitioners and purpose-driven organizations, we hope this report showcases how strategic foresight and design tools may enable new and innovative ways to grow or evolve for positive impact that contributes to a sustainable and inclusive world. We encourage you to explore strategic foresight as a framework for innovating disruptive and transformative approaches to sustainability for building the future you desire.

We are keen to hear from, and collaborate with, foresight and design practitioners who have further insights on the learnings and principles as developed in this research project, and who are interested in continuing this work and conducting future research and projects on foresight for transformative sustainability.

REFERENCES

Adams, R., Jeanrenaud, S., Bessant, J., Denyer, D., & Overy, P. (n.d.). Sustainability-oriented Innovation: A Systematic Review. *International Journal of Management Reviews*, 18(2). Retrieved November 16, 2020, from academia.edu/41725257/Sustainability_oriented_Innovation_A_Systematic_Review

Arsenault-May, S. (2003). *Praxis methodology and participatory action research.* [Paper]. Toronto: Faculty of Environmental Studies, York University, 40 – 60

Bataille, C. et al. (2015). *Pathways to deep decarbonization in Canada*, SDSN – IDDRI. [Report]. Retrieved November 2020 at electricity.ca/wp-content/uploads/2017/05/DDPP_CAN.pdf

Baum, S. & McPherson, M. (2019). The Human Factor: The Promise & Limits of Online Education. *Daedalus* 2019 148:4, 235-254

Blok, V., Gremmen, B., & Wesselink, R. (2015). Dealing with the Wicked Problem of Sustainability: The Role of Individual Virtuous Competence. *Business & Professional Ethics Journal*, 34(3), 297–327. jstor.org/stable/44074859

Bocking, S. (1997). Consuming Canada: Readings in Environmental History. Edited by Chad and Pam Gaffield. *Environmental History*, 2(2), 240–241. Toronto: Copp Clark Ltd. https://doi.org/10.2307/3985525

Boothe & Boudreault (2016). *By the Numbers: Canadian GHG Emissions* [report]. Lawrence National Centre for Policy and Management. Retrieved November 2020 at ivey.uwo.ca/cmsmedia/2112500/4462-ghg-emissions-report-v03f.pdf

Brynes, A. (2010). Sound judgements: considering the comparison between theory and practice in sustainable design. *Sustainability in Design: NOW!*, (pp. 106-110). Bangalore .

CaGBC – Canada Green Building Council (2020). *Canada's Green Building Engine: Market Impact and Opportunities in a Critical Decade* [report]. retrieved November 2020 at cagbc.org/cagbcdocs/advocacy/CaGBC_CanadasGreenBuildingEngine_EN.pdf

Candy, S. (2010). *The Futures of Everyday Life: Politics and the Design of Experiential Scenarios.* 10.13140/RG.2.1.1840.0248.

CECL – Circular Economy Leadership Coalition (2020). *Accelerating sustainable, profitable, zero-waste solutions to ensure Canadian leadership in the global Circular Economy.* [report]. Retrieved November 2020 at circulareconomyleaders.ca/wp-content/uploads/2020/09/Folio_09-18-18-Final.pdf

CCA – Council of Canadian Academies (2019). *Canada's Top Climate Change Risks: Report of the Expert Panel on Climate Change Risks and Adaptation Potential* [report]. Retrieved November 2020 at cca-reports.ca/wp-content/uploads/2019/07/Report-Canada-top-climate-change-risks.pdf

CCEDNET – Canadian Community Economic Development Network (2020). Sector Recommendations for the Recovery and Post-COVID Economy [Letter to Prime Minister]. Retrieved July 2020 at ccednet-rcdec.ca/en/new-in-ced/2020/05/14/sector-recommendations-recovery-and-post-covid

Ceschin, F., Vezzoli, C. & Zhang, J. (2010). *Proceedings of the Learning Network on Sustainability (LeNS) conference: Sustainability in design: now! Challenges and opportunities for design research, education and practice in the XXI century.* Bangalore, India, Vol 1: 29 Sep – 1 Oct 2010

Choo, C.W. (1999), The Art of Scanning the Environment. *Bulletin of the American Society for Information Science*, 25: 21-24. doi.org/10.1002/bult.117

City of Toronto (2019). *Toronto Resilience Strategy* [report]. Retrieved November 2020 at toronto.ca/ext/digital_comm/pdfs/resilience-office/toronto-resilience-strategy.pdf

Curry, B., & McCarthy, S. 2011. *Canada formally abandons the Kyoto Protocol on climate change.* Retrieved November 16, 2020, from The Globe and Mail website: theglobeandmail.com/news/politics/canada-formally-abandons-kyoto-protocol-on-climate-change/article4180809/

Doblin, J. (1987). A short, grandiose theory of design . *STA Design Journal*, 6-15.

ECCC – Environment and Climate Change Canada. (2019). *A Federal Sustainable Development Strategy for Canada 2019-2022.* Gatineau: Government of Canada.

ECCC – Environment and Climate Change Canada (2020). Canadian Environmental Sustainability Indicators: Greenhouse gas emissions [webpage]. Retrieved November 2020 at canada.ca/en/environment-climate-change/services/environmental-indicators/greenhouse-gasemissions.html

Ede, S. (2018). *Making Room for the Community-Based Circular Economy.* [article]. Retrieved November 2020 at medium.com/@sharonede/making-room-for-the-community-based-circular-economy-d54d638d1300

Edwards, J. (2018, July 16). *Canada's sustainability progress held back by eco issues.* Canadian Geographic. canadiangeographic.ca/article/canadas-sustainability-progress-held-back-eco-issues

Elkington, J. (1998), Accounting for the Triple Bottom Line. *Measuring Business Excellence*, Vol. 2 No. 3, pp. 18-22.

Ellen MacArthur Foundation (n.d.). *What is the Circular Economy?* [webpage]. Retrieved November 2020 from ellenmacarthurfoundation.org/circular-economy/concept

ESDC – Employment & Social Development Canada (2018). *Recommendations of the Social Innovation and Social Finance Strategy Co-Creation Steering Group* [report]. Retrieved July 2020 at canada.ca/en/employment-social-development/programs/social-innovation-social-finance/reports/recommendations-what-we-heard.html#h2.05

Flowers, B.S. (2003) The art and strategy of scenario writing. *Strategy & Leadership* 31(2):29-33. DOI: 10.1108/10878570310698098

Franklin, B. (1996). *Action learning; a brief review of methodology.* [Paper]. Toronto: FES, York University.

Franklin, B. (1998). *Contextural action research: extending praxis methodology.* [Doctoral Dissertation]. Santa Barbara, CA: Fielding.

Foster-Fishman, P.G., Nowell, B. & Yang, H. (2007). Putting the system back into systems change: a framework for understanding and changing organizational and community systems. *American Journal of Community Psychology*, 39:197–215. DOI 10.1007/s10464-007-9109-0

Gardner, L., Omann, I., Polzin, C., Stoessel, S., & Wentrup, K. (2011). OPEN:EU *Scenario Storylines Report: Scenarios for a One Planet Economy in Europe.* Godalming: One Planet Economy Network.

Gaziulusoy, I. A., & Ryan, C. (2017). Roles of design in sustainability transitions projects: A case study of Visions and Pathways 2040 project in Australia. *Journal of Cleaner Production*, 1297-1307.

GoC – Government of Canada (2017). *The 2030 Agenda for Sustainable Development.* [webpage]. Retrieved November 2020 at international.gc.ca/world-monde/issues_development-enjeux_developpement/priorities-priorites/agenda-programme.aspx?lang=eng

Greenwood, M. (2015). *Praxis: Connecting knowing and doing through designing and making.* [Masters Thesis, OCADU]. OCAD University Open Research Repository.

Greenham, T., Cox, E. and Ryan-Collins, J. (2013) *Mapping economic resilience* [report]. Retrieved July 2020 at friendsprovidentfoundation.org/wp-content/uploads/2017/11/nef-Mapping-Economic-Resilience-1-report.pdf

Hrvatin, V. (2016, May 31). *A brief history of Canada's climate change agreements.* [article]. Canadian Geographic. Retrieved November 16, 2020, at canadiangeographic.ca/article/brief-history-canadas-climate-change-agreements

IDEO (2015). Field Guide to Human Centred Design. Retrieved at designkit.org//resources/1.

IIT – Institute of Design. (2019, October 29). *Terry Irwin: Designing for Systems-Level Change and Transitions Toward More Sustainable Futures.* Retrieved November 2020 at youtube.com/watch?v=fDmBXxRqsW8

Irwin, T. (2015) Transition Design: A Proposal for a New Area of Design Practice, Study, and Research. *Design and Culture*, 7:2, 229-246, DOI: 10.1080/17547075.2015.1051829

Irwin, T., Kossoff, G., & Gasperak, T. (2020). *COVID-19 in the US through the lens of Transition Design.* Pittsburgh: Transition Design Institute .

Kandachar, P. (2010). Designing for global sustainable solutions: challenges and opportunities. *Sustainability in Design NOW*, (pp. 60-71). Bangalore

Lafley, A.G. & Martin, R.L. (2003). Playing to Win: How strategy really works. Harvard Business Review Press, Boston Mass.

MacDowell, L. S. (2012). *An environmental history of Canada.* UBC Press. Vancouver, BC.

Manzini, E. (n.d). *Resilient Systems & Sustainable Qualities. Small, local, open, connected: An emerging scenario* [report]. Retrieved November 2020 at current.ecuad.ca/wp-content/uploads/2013/04/Current04_Manzini_ResilientSystems.pdf

Manzini, E. (2013). Small, local, open and connected: Design research topics in the age of networks and sustainability . *Sustainability in Design NOW*, (pp. 14-22). 2010.

Mintzberg, H. (1994) The Fall and Rise of Strategic Planning. Harvard Business Review. Retrieved November 2020 at https://hbr.org/1994/01/the-fall-and-rise-of-strategic-planning

McKinsey Center for Business and Environment (2016). *The circular economy: Moving from theory to practice.* [report]. Retrieved November 2020 at mckinsey.com/business-functions/sustainability/our-insights/the-circular-economy-moving-from-theory-to-practice

Norman, D. (2014, December 2). DesignX: A Future Path for Design. Retrieved December 31, 2020, from jnd.org website: jnd.org/designx_a_future_path_for_design/

OTF – Ontario Trillium Foundation (2020). *Resilient Communities Fund* [webpage]. Retrieved August 2020 at otf.ca/resilient-communities-fund?redirected=1

Popper, R. (2008). Foresight Methodology [chapter]. In *The Handbook of Technology Foresight*, edited by Georghiou, Luke 44–88: Edward Elgar Publishing, Cheltenham, United Kingdom.

Porter, M. E. (1996). What is Strategy? *Harvard Business Review* 74, No. 6. (61 - 78)

Porter, M. E. (2008). The Five Competitive Forces That Shape Strategy. *Harvard Business Review* 86, No. 1. (78 - 93)

Press, J. (2020). *Liberals review rollout of social finance fund to combat pandemic fallout* [media article]. Retrieved August 2020 at cbc.ca/news/politics/liberal-review-social-finance-fund-1.5656098

RIA Responsible Investment Association (2019). *Canadian Impact Investment Trends Report* [report]. Retrieved November 2020 at riacanada.ca/research/2018-impact-trends-report/

Rebello, S. & Black, R. (2020). Multi-Level Perspective Model – Synthesis of Sustainability in Canada Past & Present [graphic]. MDes Final Research Paper; Towards Sustainable Futures – Using strategic foresight in the design of transformative sustainability'. Retrieve at openresearch.ocadu.ca/view/divisions/sch=5Fgs=5Fsfi/

Russell, A. 2020. T*rudeau will not commit to ending boil-water advisories on First Nations by 2021.* Retrieved November 18, 2020, from Global News website: globalnews.ca/news/7416559/trudeau-boil-water-advisories-first-nations-2021

Ryan, C., Twomey, P., Gaziulusoy, A. I., McGrail, S., Chandler P (2016). Scenarios 2040 – *Results from the second year of Visions and Pathways 2040: Scenarios of Low Carbon Living.* Melbourne, Australia

Sachs, J., Schmidt-Traub, G., Kroll, C., Lafortune, G., Fuller, G., Woelm, F. (2020). *The Sustainable Development Goals and COVID-19. Sustainable Development Report 2020.* Cambridge: Cambridge University Press.

Snyder, D. (2020). *'Greta Effect' drives interest in social justice* [media article]. Toronto Star. Retrieved November 20 2020 at thestar.com/life/insidersguide/2020/10/03/greta-effect-drives-interest-in-social-justice.html

Statista (2020). *Canada: Degree of urbanization from 2009 to 2019* [webpage]. Retrieved November 2020 at statista.com/statistics/271208/urbanization-in-canada/

Statistics Canada (2020). *COVID-19 in Canada: A Six-month Update on Social and Economic Impacts* [report & webpage]. Retrieved November 20 2020 at www150.statcan.gc.ca/n1/pub/11-631-x/11-631-x2020003-eng.htm#c

Stanford d.school (n.d.). *"How Might We" questions*. [online resource]. Retrieved November 2020 at dschool.stanford.edu/resources/how-might-we-questions.

Stein, S. & Goodman, L. (2007) *Foresighting for Meaningful Innovation: SMARTlab as Case Study*. Class reading materials, OCADU SFI Program 2018-2020.

Steward, T. (2012, November). *A Brief Introduction to the Multi-Level Perspective (MLP)*. IGov New thinking for Energy. Devon, United Kingdom: University of Exeter.

Tasker, J.P. (2020). *Trudeau unveils new net-zero emissions plan to meet climate change targets* [news article]. CBC News. Retrieved November 2020 at cbc.ca/news/politics/net-zero-emissions-1.5807877

Tichner, U. (2010). Design for Sustainability: where are we and where do we need to go? *Sustainability in design NOW*, (pp. 79-88). Bangalore .

Toronto Public Health (2020). *COVID-19: Status of Cases in Toronto* [webpage]. Retrieved November 19 2020 at toronto.ca/home/covid-19/covid-19-latest-city-of-toronto-news/covid-19-status-of-cases-in-toronto/

TREC – Toronto Renewable Energy Cooperative (n.d). *About TREC* [webpage]. Retrieved June 2020 at trec.on.ca/about/#vision

UNFCCC – United Nations Framework Convention on Climate Change (2016). *The Paris Agreement* [webpage]. Retrieved July 2020 at unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

Van der Heijden, Kees. (1997). *Scenarios, Strategies and the Strategy Process*. Nijenrode University Press, Breukelen, The Netherlands. Retrieve at nijenrode.nl/library/publications/nrp/1997-01/1997-01.html

White, D.F. & Roberts, J.T. (2019). Post Carbon Transition Futuring: For A Reconstructive Turn in the Environmental Social Sciences? *The Cambridge Handbook of Environmental Sociology. Forthcoming*. academia.edu/38261622/Post_Carbon_Transition_Futuring_For_A_Reconstructive_Turn_in_the_Environmental_Social_Sciences

Wilkinson, L. (1995). *How to Build Scenarios* [article]. Wired Magazine © 2009 Condé Nast Digital. Retrieved 2020 at wired.com/wired/scenarios/build.html

APPENDICES

APPENDIX A: Visions for Sustainability for FutureTREC

Vision	Definition
Driving the Circular Economy Educate, advocate and incubate inspirational projects that help decouple local economic growth from the consumption of finite world resources	The Circular Economy is an alternative to the 'take-make-waste' extractive industrial model by designing out waste and creating economic opportunities out of materials that may otherwise be thrown away (Ellen MacArthur Foundation n.d.). Drivers of the circular economy include increasing materials prices, shifting consumer demand, waste regulation, social norms like the sharing economy, and dematerialization through digital assets (McKinsey Center for Business and Environment 2016). In Canada, the Circular Economy Leadership Coalition has spearheaded corporate interests for 'accelerating sustainable, profitable, zero-waste solutions to ensure Canadian leadership in the global Circular Economy' (CECL 2020, 1). There are opportunities in this space for community-based responses, for example, physical infrastructures like makerspaces and community technology workshops (Ede 2018).
Improving Lives in our Cities Create breakthrough urban experiences by leveraging democratic, collaborative, community-building financing, tools and systems	More than 80 percent of the Canadian population live in urban centres, with the largest cities attracting the newest immigrants and young adults from rural communities (Statista 2020). The COVID-19 coronavirus has only exacerbated issues facing cities in Canada and around the globe, with the impact in large cities like Toronto disproportionately impacting racialized and lower-income communities (Toronto Public Health 2020). The increasing demands on urban infrastructure and quality of life propel the need to find innovative solutions for livability, equity, housing, energy, transit and public health. A review of Toronto's Resilience Strategy illuminates several opportunity areas in which community-based solutions for equitable, inclusive and low carbon options might thrive (City of Toronto 2019, 50).
Promoting Local Energy Independence Accelerate our transition to a zero-carbon future through locally owned, community-scaled energy projects	With ongoing advances in renewable energy technology and plummeting costs, community-scale renewable energy projects are becoming more common across Canada as a component of sustainability objectives, as an opportunity to demonstrate innovation, or in rural and remote communities as a source of revenue and a cost-saving measure to alleviate dependencies on more expensive alternatives (Miller et al. 2019). The growth of the green building sector, including smart and healthy buildings, energy retrofits and storage, is rapidly growing and shows great potential for post-pandemic incentives (CaGBC 2020). As governments unveil new net-zero emissions plan to meet climate change targets (Tasker, 2020), and investors increasingly seek out impact investment opportunities (RIA 2019), opportunities in renewable power generation, district energy systems, energy retrofits, cleantech and other carbon-busting solutions are poised to increase. Community power and community finance can leverage the strong potential to play a meaningful role as the country 'builds back better' from COVID-19 and beyond.

Vision	Definition
Facilitating Inclusive Communities Amplify and prioritize projects led by members of underserved communities including youth	Risks to human health and wellness in Canada posed by climate change include adverse impacts on physical and mental health due to hazards accompanying extreme weather events, heatwaves, lower ambient air quality, and increasing ranges of vector-borne pathogens (CCA 2019). These impacts are disproportionately felt by the most vulnerable communities, including BIPOC (Black, Indigenous, people of colour), youth and the elderly. The current COVID-19 pandemic has laid bare many of the social and economic hardships facing marginalized and young Canadians including declines in mental health; exposure to COVID-19, ability to meet financial obligations, and a ride in harassment or attacks based on race, ethnicity or skin colour (Statistics Canada 2020). In growing numbers, young people are seeking out careers that touch on environmental, social justice and non-profit sectors (Snyder 2020). Community-based solutions can offer a means to support Indigenous, Black and young people of colour who are pushing for system change and ecosystem protection.
Community Economic Resilience Help our communities thrive in the face of unprecedented challenge, through local investments in projects that promote sustainability and foster local job growth.	Resilient local economies as "those that can provide good livelihoods for people, and use their fair share of resources, whilst responding to short-term shocks and long-term changes. These shocks and changes may relate to the ecological, social and broader economic conditions within which they operate" (Greenham, Cox & RyanCollins 2013). In Canada, sectors which support community economic resilience and represent community economic development – cooperatives, social enterprises, non-profit organizations – represent 10.1% of GDP and employ 2.5 million Canadians (CCEDNET 2020). Their work to spur the Federal Government's strategic role in supporting the development of social innovation and social finance ecosystems (ESDC 2018) includes an urgent request to speed up the deployment of a $755 Million social finance fund, to open new sources of capital to the charitable and non-profit sectors that are combating the fallout of the COVID-19 pandemic at the community level (Press 2020). Other funders have responded to the need to support non-profits stabilize and build their capacity and resiliency in the aftermath of COVID-19 (OTF 2020). These signals only reinforce the demand and opportunity for community-scale resilience initiatives to meet the needs of communities across Ontario.

APPENDIX B: Participant Survey Questions

1. Participant Instructions & Confidentiality Agreement

Please confirm you have read, and agree to, the consent form you received in the e-mail invitation to participate in this survey.

- I agree / No thank you.

2. What is the nature of your relationship with TREC? Please choose all that apply.

- TREC Staff or former staff member
- TREC Board or former Board member
- Staff or Board of an entity incubated by TREC
- TREC program delivery partner
- Customer
- TREC or TREC Project Funder
- Industry Partner
- Environmental Ally
- Community Bond Holder
- Other (please specify)

3. Please rate how familiar you are with these entities
(Scale = Unfamiliar / Somewhat Familiar / Very Familiar)

- TREC Renewable Energy Co-op
- SolarShare
- Relay Education
- WindShare
- Federation of Community Capital Coops
- Tapestry Community Capital
- Other (please specify)

4. How strongly do TREC projects reflect the following values?
(Scale = Strongly / Somewhat / Not At All / Don't Know)

- Enables community based, democratic ownership
- Supports community and social finance solutions
- Supports a clean energy transition
- Generates innovative and replicable solutions to address climate change

5. Which of the following would you consider TREC's greatest strengths? Please choose up to 2.

- Supports community and cooperative social enterprises
- Creates and delivers renewable energy literacy and education
- Incubates community owned renewable energy projects
- Provides social finance literacy and support through the community bond model
- Informs policy through research and advocacy of democratic ownership of community projects
- Other (please specify)

6. Please share a few sentences to explain why you picked your top selection(s) to the previous question: (text box)

7. Which of the following opportunity areas have the potential to create the BIGGEST positive impact over the next 10 years? Rank from highest potential (1) to lowest potential (5).

- **Driving the Circular Economy:** Educate, advocate and incubate inspirational projects that help decouple local economic growth from the consumption of finite world resources
- **Building Community Economic Resilience:** Help our communities thrive in the face of unprecedented challenge, through local investments in projects that promote sustainability and foster local job growth
- **Improving Lives in our Cities:** Create breakthrough urban experiences by leveraging democratic, collaborative, community-building financing, tools and systems
- **Promoting Local Energy Independence:** Accelerate our transition to a zero-carbon future through locally owned, community-scaled energy projects
- **Facilitating Inclusive Communities:** Amplify and prioritize projects led by members of underserved communities including youth

8. Please help us understand why you selected your top choice above, in a few sentences: (text box)

9. Rate TREC's credibility in each of these areas.
(Scale = Very Credible / Somewhat Credible / Not Credible)

- **Driving the Circular Economy**
- **Building Community Economic Resilience**
- **Improving Lives in our Cities**
- **Promoting Local Energy Independence**
- **Facilitating Inclusive Communities**

10. At what scale do you feel TREC is best positioned to have impact? (check all that apply)

- National scale
- Provincial scale
- Municipal scale
- City scale
- Neighbourhood scale
- Other (please specify)

11. Thank you for completing the Future TREC survey. As part of our research study, we are hosting expert interviews and a design workshop. If you would like to participate further, please provide your contact information.

Name, Company / Organization, Province, Email Address, Phone Number

TIME HORIZON: 2030

World: Stable but vulnerable

Select your actor:

Daily Experiences

What are some day to day experiences?

Thinking

What are they thinking about?

Feeling

How are they feeling in this world?

What problems are they trying to solve?

Which of our focus areas within **Community Economic Resilience** would best support our actor?

COMMUNITY-BASED ECONOMIES

THE BUILT ENVIORNMENT

ENERGY

For your selected areas, consider the following questions, and outline some ideas in the space provided

- How might this focus area create value for the actor?
- What challenges might it solve or support?

Tips:

- *These are rough, rapid and imaginative. The more ideas the better!*
- *Remember to refer back to your world!*

TIME HORIZON: 2030

World: Stable but vulnerable

Choose one idea:	Describe what it might look like? Is it a policy, program, product or service?

What other stakeholders might be involved?	What unique value might TREC bring to this solution?
How might TREC participate in this solution or idea?	How might this solution or idea accelerate the mission and visoin of TREC?

APPENDIX D: Insights for new approaches within sustainability, using the MLP framework

Level	Insights
Landscape (slow-moving and deep cultural patterns and mindsets)	● Co-create new visions: To avoid incremental and the "less of the same" mentality, leverage creative and generative mediums to re-think current systems of doing and making.
	● Empowering optimism: Viewing climate change as a mounting crisis continues to connect us to present day restrictions and practices. Building a process that enables optimism allows participants and organizations to be resilient in the face of change.
	● The future is collaborative: A collaborative co-created vision abundance is only possible if we rethink our individualistic or competitive approach to solution-making.
	● Replenishing radical regeneration: Focus on building with future needs in mind, not only monetary, but social, cultural and planetary.
	● Transitions must consider intersectionality: Without reckoning with the systemic oppression and discrimination that exists within institutions and resulting climate action plans, these oppressions will be re-inscribed into solutions and visions for the future.
Regime (stable business and market activity)	● Driving the circular economy: Widespread adoption of practices that help decouple local economic growth from the consumption of finite world resources
	● Focusing on product-service innovation over technological breakthrough: The technology exists and will exist, it is human systems that need to be re-wired.
	● Focus on local energy independence: This requires a systems approach; a combination of technological investment, re-shaping of policy, and provincial alignment on targets and transition plans.
	● How do we shift normative culture?: FutureTREC participants focused on community-focused networks of social innovations served by local collectives and offering different forms of community provisions
Niche (experimental level of new & disruptive ideas)	● Learning from and supporting Indigenous energy projects: Indigenous ownership in small and mid-sized clean energy projects continues to rise and create transformational change.
	● Community finance: TREC's focus on community bonds, and community financing as a key lever for change has created new business models and economic resilience for emerging social impact programs
	● Agri-tech and vertical farming: TREC participant conversations continuously returned to food, and the need for food security across Canadian communities, and the potential for technology to support community-based solutions.