Managing environmental and energy transitions for regions and cities

Peripheries at the Core: Notes from rural places and regions on environmental and energy transition

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Background information

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The workshop is part of a five-part workshop series in the context of an OECD/EC project on "Managing environmental and energy transitions for regions and cities". The five workshops cover "Managing the transition to a climate-neutral economy, "Managing environmental and energy transitions in cities", "Managing the transition to a circular economy", "Managing environmental and energy transitions in rural areas", and "Financing, scale-up and deployment". The outcome of the workshops supports the work of the OECD Regional Development Policy Committee and its mandate to promote the design and implementation of policies that are adapted to the relevant territorial scales or geographies, and that focus on the main factors that sustain the competitive advantages of regions and cities. The seminars also support the Directorate-General for Regional and Urban Policy (DG REGIO) of the European Commission in work of integrating sustainability transitions in the next generation of European Union Cohesion Policy programmes 2021-2027, as well as to support broader discussion with stakeholders on managing long-term environmental and energy goals in EU regions and cities. The financial contributions and support from DG REGIO are gratefully acknowledged.

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1 INTRODUCTION

Post-war rural and urban development across OECD countries was based on particular environmental and energy paradigms (fossil fuel supported natural resource exploitation dependent upon an uncompensated environmental waste sink). Those paradigms are shifting through growing awareness of the impacts of such approaches on the environment. While our concern here is with the implications of that transition for rural places and regions, the implications are no less important for urban centers because the rural and the urban are symbiotically tied. Food, fuel, fibre, water, air, and respite are all among the many vital ties linking rural and urban – each of which is under pressure from environmental and energy transition.

Attention in research and policy must recognize that environmental and energy transition interventions will not involve one-time expenditures, and cannot just target single sectors. After all, succeeding with multiple policy targets will require multiple forms of policy instruments that are multi-sectoral and multi-level (Buckwell, 2019; Phillips, 2019). Such policy must account for rural heterogeneity, and must capitalize upon synergies, connectivities, and interdependencies between rural places and between rural and urban places (Bock, 2019; Phillips, 2019). Policy attention in particular must recognize that rural regions have less capacity to manage transition and often have more fragile single-resource-dependent economies. The policy transition toward neoliberalism, which shifted social action and investment from government to the private sector, also means that government policy must now re-intervene in rural places where private sector investments have neglected the key infrastructures of the 21st Century economy. The failure to support vulnerable rural regions through transition runs the risk of creating social and political instability (OECD, n.d.).

This working paper outlines the details supporting five key messages:

- Rural communities, economies, and landscapes are vital players in environmental and energy transition;
- Environmental and energy transitions are not simply ‘additional variables’ in rural places; instead, they impact all facets of rural places, life, and economies;
- Change is a normal process, and the long experience of rural places with change means that they are experienced and ready to work through a proactive and progressive approach to environmental and energy transition with rural communities front and center in the process;
- Despite that experience with change, the fact that many rural places and regions are still embedded in their former economies and dependencies means that they will need to be directly and meaningfully engaged in the process, and will need to be supported and presented with concrete policy and funding commitments that support communities and workers through a just transition. Such supports must address gaps in critical infrastructure, especially information and communications technologies, and skills that bottleneck economic development opportunities and the transition to carbon-neutral economies; and
- Place-based community development, with support of top-down public policy, creates the strong foundation upon which different and unique rural places and regions can each work through those transformations and move creatively forward in the new economy.

Following this introduction, the working paper sets background and context for understanding the contemporary imperatives around environmental and energy transitions for rural places and regions that is part of a more general shift towards a carbon-neutral economy. This includes an historical sketch of rural development and a review of critical trajectories influencing future transition. This is followed by discussion of the theoretical and practical directions influencing environmental and energy transition, including the key questions such transition raises. The final section looks forward with a vision for rural development that supports the flexibility and innovation necessary to cope with the opportunities and challenges of environmental and energy transition.

Definitions and interconnections through transition

Environmental and energy transition

Environmental and energy transition will involve and impact all aspects of our current ways of engaging with, and even understanding, the economy, the environment, our communities, and our futures. But what does the phrase 'environmental and energy transition' mean? To start, 'transition' implies attention to a 'process' – a process of change from one state to another. In some of those coming changes the impacts may be small, in others larger, and in still others completely transformative. Some impacts will unfold gradually, others incrementally, and still others more abruptly and sudden. Policies and programs must be attentive to the ways rural places, people, and economies will work through these processes of change over time and be prepared for variability in the pace of change.

It is important to frame proactive policy that targets the processes of change at the heart of environmental and energy transition. The literature suggests a need to be attentive to the cumulative impacts that can flow from change and transition, rather than pursuing isolated project or sector-based strategies. Social, economic, community, household, transportation, communications, and a variety of other systems have developed in accordance with former environmental and energy paradigms, all will be transitioning (albeit at different paces), and all will continue to impact one another moving forward. Possibilities for wider and unintended impacts mean that environmental and energy transition needs 'cumulative impacts thinking' (Gillingham et al., 2016) and cross-society, cross-economy, and cross-government solutions, actions, and investments (PricewaterhouseCooper, 2011).

The reciprocal relationship between energy and the natural environment is central to the imperatives driving this transition. As described below, historical understandings of energy sources and uses, as well as historical understandings of the resilience and capacities of the natural environment, are changing. Changing with them is our understanding of the reciprocal relationships between energy, the environment, rural community development, and economic development. There is a need to transition those relationships in ways that will address pressing environmental issues (German Bioeconomy Council, 2018b; San Juan, Bogdanski and Dubois, 2019).

Environmental and energy transition is about the move towards a more diverse, circular, sustainable, and carbon-neutral economy. The notion of diversified rural economies is an old one to which attention has returned given the interactions of globalization, rural economic restructuring, and environmental and energy transition (OECD, n.d., 2019b). Attention to more circular and sustainable economies, in support of more resilient rural communities and regions, has also gained attention. A circular economy refers to shifts in the production-consumption-waste cycle so as to minimize inputs of natural resources and reduce waste outputs (Kirchherr, Reike and Hekkert, 2017; OECD, n.d., 2019b). Reducing resource use in production, and re-using materials after consumption, can assist in the reduction of natural resource consumption linked with economic development (PricewaterhouseCooper, 2011). These concerns link back to environmental and energy transition to the response to climate change.

In addition to considerations of structural change, cumulative impacts, and circular economies, the environmental and energy transition is also heavily dependent on new technologies. As described below, the previous environmental and energy paradigms were tied closely to specific technology revolutions. These revolutions set in place 'techno-economic' paradigms (Hayter, 2008, 2000) where the economic, investment, policy, labour, community, and a host of other systems aligned over time to support and reinforce these arrangements (Amin, 2009, 1999). Transition to a new techno-economic paradigm emerging through environmental and energy transition will similarly be linked to enabling technologies. A simple example from the working paper is how rural places will become energy centers – with that energy being generated from place-specific sources such as solar, wind, tidal, hydro, geothermal, or through the rural bioeconomy (Marsden, 2016; Wiśniewski and Kistowski, 2016). Not only will new/improved technologies be needed to generate this energy, but they will also be needed in managing/controlling many small systems operating and interacting across different scales.

Bioeconomy

All of the above dimensions of the environmental and energy transition are evident in the emerging literatures, policies, and actions around the bioeconomy. The German Federal Ministry of Food and Agriculture and the Food and Agricultural Organization (FAO) of the United Nations have worked to develop a framework for moving forward bioeconomy conversations, policies, actions, and investments. Their joint 2018 Global Bioeconomy Summit generated a working definition of the bioeconomy that includes: "the production, utilization and conservation of biological resources, including related knowledge, science, technology and innovation, to provide information, products, processes and services across all economic sectors aiming towards a sustainable economy" (German Bioeconomy Council, 2018a, p.2).

Put more simply, the bioeconomy "can be defined as the production and utilization of biological resources, to provide goods and services across all economic sectors" (FAO, 2017, p.1). Key in all these definitions is that environmental and energy transitions are important for more circular and carbon-neutral economies (European Commission, 2018). These definitions also build upon an earlier recognition that "the emerging bioeconomy is likely to be global and guided by principles of sustainable development and environmental sustainability" (OECD, 2009, p.22).

The OECD's bioeconomy policy agenda report links the economy with the environment and with modes of energy use. It also links opportunities in the bioeconomy to current challenges around economic restructuring, quality of life, rural transition, food security, the need for environmentally sustainable production, population growth, climate change, etc.. With a specific technology orientation, the OECD's (2009, p.15) report suggests that "biotechnology offers technological solutions for many of the health and resource-based problems facing the world. The application of biotechnology to primary production, health and industry could result in an emerging 'bioeconomy' where biotechnology contributes to a significant share of economic output".

The role of the bioeconomy in transitioning existing rural resource-dependent industries is clear through opportunities in energy generation, increased production efficiencies, reduced material inputs costs through circular product cycles, all to support more sustainable production (European Commission, 2016). The bioeconomy can also extend already active efforts to diversify rural economies (OECD, n.d.; PricewaterhouseCooper, 2011) by building upon place-based assets and opportunities around bioenergy, bio-based materials, basic 'building blocks' such as bio-based chemicals and polymers, enzymes/microbiota, residues, and others (San Juan, Bogdanski and Dubois, 2019). It can also expand rural eco-systems services that have potential for addressing global issues as food security, natural resource management, and climate change (European Commission, 2018; OECD, n.d.; San Juan, Bogdanski and Dubois, 2019).

The potential for the bioeconomy to support environmental and energy transition faces a number of challenges. One involves how disruptions within economic systems will lead to opposition and resistance.

The OECD's (2009. p.17) early policy agenda noted how "disruptive and radical innovations can lead to the demise of firms and industrial structures, creating greater policy challenges". Resolving such policy and regulation challenges will take time, but attention to future goals and outcomes, the application of full life-cycle assessments, and cumulative impacts thinking has the potential to "identify the most environmentally sustainable alternatives" (OECD, 2009, p.17). A further critical challenge concerns the capacity of the natural environment to sustain the demands of an expanding bioeconomy as it would be counter-productive if these demands exceeded the carrying capacity of the environment (Bringezu et al., 2009; European Commission, 2015). There are gaps in knowledge and information in these areas and current case studies are limited in scope and scale relative to the potential of the bioeconomy (San Juan, Bogdanski and Dubois, 2019). Technology may hold some answers to this challenge, but so too will sound policies and regulations (OECD 2009; PricewaterhouseCooper, 2011).

Implementation in the bioeconomy has, as yet, been slow. Wiśniewski and Kistowski (2016), for example, investigated 20 low carbon economy plans for rural municipalities in Poland including projects aimed at the protection of soils, afforestation, and development of agricultural biogas plants. Despite proposed strategic moves towards low carbon development in agriculture, most biomass use remains concentrated in the production of electricity and heat. There are also nascent successes at implementation. Marsden (2016), for example, highlights the development of post-carbon economy ecovillages in Finland where energy, food, and waste systems are connected across small communities to counter centralization trends. He also cites the Brecon Beacons National Park in the UK where small communities in an energy co-operative are generating revenue from small hydroelectric projects to fund electric car sharing.

The FAO (2019, p.1) notes how "the development of an economy that is based on biological resources faces several trade-offs. It is crucial that bioeconomy development contributes to sustainability and helps to achieve the sustainable development goals". To assist the development of sustainable bioeconomy strategies, policies, and programs, the FAO (FAO, 2019; San Juan, Bogdanski and Dubois, 2019) has suggested 10 'aspirational' principles. The argument is that a sustainable bioeconomy should:

1. support food security and nutrition at all levels;
2. ensure that natural resources are conserved, protected, and enhanced;
3. support competitive and inclusive economic growth;
4. make communities healthier, more sustainable, and harness social and ecosystem resilience;
5. rely on improved efficiency in the use of resources and biomass;
6. be underpinned by responsible and effective governance;
7. make good use of existing relevant knowledge and proven sound technologies and good practices, and, where appropriate, promote research and innovation;
8. use and promote sustainable trade and market practices;
9. address societal needs and encourage sustainable consumption; and
10. promote cooperation, collaboration and sharing between stakeholders in all relevant domains and at all relevant levels.

United Nations Sustainable Development Goals

As suggested through the bioeconomy, policies and programs supporting rural places and regions through environmental and energy transition can link to larger goals, objectives, and desired outcomes. The OECD's (2019b) rural policy principles and Rural 3.0 policy framework (OECD's (n.d.), for example, not only seek better policies and better lives for rural people, but also to support long-term capacity-building

and sustainable development. This attention to resilience is important as the processes of environmental and energy transition, and the associated social, economic, and demographic changes, unfold.

Policy choices around environmental and energy transition also link to the United Nations Sustainable Development Goals (SDGs) (United Nations, 2015). For rural policy, these high-level goals support many of the areas of rural transformation that are important in current policy discussion. The United Nations SDGs support attention to the quality of rural lives [no poverty; zero hunger; good health and well-being; gender equality]; attention to the importance of rural resilience [quality education; reduced inequalities; sustainable cities and communities; peace, justice and strong institutions]; attention to healthy rural environments [clean water and sanitation; life below water; life on land]; attention to healthy rural economies [decent work and economic growth; responsible consumption and production; industry, innovation and infrastructure]; and the opportunity for rural places and regions to play a role in addressing pressing global issues [affordable and clean energy; climate action]. United Nations SDGs also reflect the broader imperative that addressing the challenges and opportunities that arise through environmental and energy transition will require partnerships, collaborations, and a cumulative thinking approach [partnerships for the goals] (German Bioeconomy Council, 2018a; OECD, 2009).

2 CONTEXT FOR TRANSITION

This first section provides background for understanding the context of contemporary environmental and energy transition. It begins with an historical thumbnail of development trajectories from the post-war period. It is important to describe and understand such trajectories because they have a continuing impact – in terms of a built legacy, a policy legacy, a jurisdictional legacy, and the legacy of expectations among governments, firms, communities, families, and individuals. Such legacies can both support and hinder environmental and energy transition. The second part introduces the context of the 'new' rural economy (Atterton, 2016; Halseth, Markey and Bruce, 2010). Too often, rural policy grappling with transition tries to re-create the outcomes of the early post-war period while failing to recognize that it is not the 1950s or 1960s anymore, and never will be again (Markey, Halseth and Manson, 2012). The third and fourth parts of this section review specific trajectories and some of the key challenges or barriers impacting contemporary environmental and energy transition.

Historical thumbnail of rural development

Rural places and regions across OECD countries are varied and diverse. This complexity is important as it affects the possibilities and pathways associated with environmental and energy transitions. As such, it will be returned to later in the working paper as attention switches to place-based development approaches and policies. At this point, while still recognizing this wide diversity, it is also possible to identify historically important themes in rural community and economic development. This is important because past decisions, investments, mindsets, policies, etc. all continue to have implications into the present and for the future. Failure to build future community and economic development interventions that do not recognize these past actions will limit their effectiveness.

Post-war "investment period"

Prior to the Second World War, it is recognized that rural places and regions were very much 'on their own' with respect to development planning, infrastructure investments, social services, and the like (Scarpa, 2013; Sullivan, Ryser and Halseth, 2014). National governments, such as Canada, Italy, and Poland, undertook relatively few national programs beyond basic transportation and taxation schemes (Borzaga and Tortia, 2007; Leś and Jeliazkova, 2007). This laissez-faire approach resulted in tremendous variability across rural places. Wealthy places and regions, for example, would have the financial and community capacity resources to invest in infrastructure, services, and facilities while less well-off regions could not. Across OECD countries, there were many rural regions that were relatively isolated, not well-connected or integrated into the national economy, and thus ill-equipped to support community and regional development.

All of this changed, in the three decades immediately following the Second World War. In that period, countries faced with a number of challenges. These included the political pressures of the Cold War, the need to rebuild economies and infrastructure, and the need to better manage the market excesses that had led to the global economic depression of the 1930s. As a result, countries adopted a much more

interventionist Keynesian public policy approach (Halseth, Markey and Ryser, 2019; Harvey, 2005). For rural regions, the implications were dramatic. Remote and isolated regions were connected to national economies to harness available natural resource wealth. National programs in health, education, and a variety of social services expanded the availability and quality of these key community development supports to all people regardless of their urban or rural residence, advantage or disadvantage.

National rural and remote development policy extended transportation systems, linked regions into international grids of communication and energy, and linked them more effectively into the national economy. Depending upon the country, natural resources such as timber, minerals, or energy in the form of coal, hydropower, oil, or gas were accessed to feed the post-war economic boom (Argent, 2013; Skúlason and Hayter, 1998). Whether consumed within the national economy of highly developed industrial countries, or exported in their raw form to support a growing GDP, natural resources were a cornerstone to the considerable growth experienced in rural places and regions from the early 1950s into the early 1980s (Connelly and Nel, 2017a). In a resource-frontier region such as British Columbia, Canada, this development policy was remarkably successful. With decades of on-going industrial investments in mines, oil and gas production, and sawmills and pulp mills, every region of the province showed population and economic growth during each 5-year census reporting period from 1950 to 1980 (Markey, Halseth and Manson, 2012).

This rural development era, and its supporting public policy and investment processes, was in turn supported by particular environmental and energy paradigms. The environment was generally understood by policy makers and industry as a 'resource bank' from which natural capital could be extracted to support economic capital. While there were debates, conflicts, and voices in opposition to this view, the approach made limited recognition of the intrinsic values of wilderness and natural areas, or that ecosystem resources were already providing valuable and critical ecosystem services. Instead, resources that were not harnessed for their economic value were often viewed as being wasted, or stranded – and the goal of the post-war development mindset and investments was to bring these resources into 'useful production'. During these decades, limited attention was paid by governments and industry to issues of resource depletion, pollution, or sustainability. Some industries, such as forestry, did move into 'sustainable yield' practices, but such simply sought to transfer an agricultural paradigm into wilderness forests – a transition that we now know is fraught with limitations (Clapp, 1998; Hayter, 2003; Marchak, Aycock, and Herbert, 1999).

Secondly, the environment was also understood as a necessary, and uncompensated, waste sink (Karavitis, Bosdogianni and Vlachos, 2001). Many rural resource-extracting industries were also polluting industries. The processes associated with the extraction and basic refining (or 'breaking the bulk' of the raw resource into a condensed commodity to reduce shipping costs) of natural resources created massive landscape disturbances, very often deployed noxious chemical additives and processes, and generated tremendous volumes of waste – solid, liquid, gaseous (Keske et al., 2018; Spitz and Trudinger, 2019). Using the environment as a waste sink helped to reduce operating costs. At the time, it was thought that the vast rural environment would be able to cope with this pollution. Beyond rural industry, the growing urban population also began to increasingly send its solid waste, sewage waste, and air pollution wastes into rural regions (Kelly-Reif and Wing, 2016; Monaco et al., 2015)[1].

If the environmental paradigm of the time was constructed around a specific social and economic conceptualization of the natural landscape and its geophysical and ecosystem process, so too was a specific suite of energy paradigms developed. Key among the energy paradigms that drove rural and remote development in the post-Second World War era was the fossil fuel paradigm. Cheap, transportable, and powerful, fossil fuels supported the movement of goods and people. Remote extraction and basic

[1] Key difference for waste management between rural and urban regions is that logistical costs are higher in rural regions where waste, and waste disposal facilities, are more widely distributed (Bahers and Kim, 2018).

processing operations all needed energy for extraction, the movement of the raw resource to manufacturing centers required energy to move by road, rail, and boat.

A second energy paradigm involved water. A key rural asset, waterpower was not a new energy source, but the hunger for electricity in the post-war economic boom drew increasingly massive hydroelectric projects into the more remote rural regions of many OECD countries, such as Canada and Iceland (Macfarlane and Watson, 2018; Skúlason and Hayter, 1998). Displacement of communities, and destruction of habitats, happened as a result – all put down to the costs of progress (Windsor and McVey, 2005). As described below, waterpower is likely to figure significantly in energy transition, but along with the community benefits of power for development and living, new hydro-power projects are more likely to be small-scale and less impactful on the ecosystem.

A third energy paradigm involved the massive growth of energy exports – completing the already underway transformation of energy from a required industrial input to a commodity of preeminent importance. Whether fossil fuels (such as coal, oil, or gas), hydroelectricity (sometimes exported as electrical energy itself, or sometimes as stored water releases), or mineral energy (such as uranium), energy booms literally and metaphorically fueled rural and remote development, transforming regions and economies. It also effectively bound rural regions into a dependent relationship with national and international economies. This set up relationships between external capital and internal resource endowments (and labour sources) that would have important consequences for later efforts to diversify rural economies, engage with environmental and energy transition, and shift towards carbon-neutral economies.

As we reflect back, the rural environment provided the foundation for urban and national economic growth and development in the first three decades of the post-war period. Wealth came from rural region's environmental capacities – extending from the exploitation of non-renewable natural resources, to renewable resources, to ongoing activities such as agriculture and food production. That same environment filtered the air and water, and provided the essentials of life for a population increasingly concentrating in urban settings. It also supported national and urban development as source regions for fresh water and energy.

Expectations

The post-war rural and remote development boom across many OECD countries also set up expectations around community and economic development, and around life and lifestyle, that have continuing importance in development debates today. In terms of the economy, it set up expectations around the role of rural regions in the national economy and the norms for rural work. States became dependent, if not addicted (Freudenberg, 1992), to the massive revenues that natural resource exploitation could generate – massive revenues that were due, in part, to the uncompensated impacts borne by the natural environment. Labour became dependent upon the jobs and high wages found in these same industries. Low-skill high-wage work defined the post-war resource sector.

The labour environment in resource towns of this era was, however, highly gendered. The workplace was male, and this created dependencies within households that affected a spectrum of concerns from abuse and violence to the wages (and future pension benefits) earned by women in these high-cost towns (Halseth, Reed, and Reimer 2010; Halseth and Ryser, 2004). Since the global economic recession of the early 1980s, labour had difficulty finding a new approach to work quality, wage pay, and employment levels. In the 'resource frontier' towns of countries such as Australia, Canada, Finland, and New Zealand, the loss of good paying resource industry jobs negatively impacted both communities and the families of workers who had difficulty finding other work (Argent, 2017b; Connelly and Nel, 2017b; Halonen et al., 2017; Halseth, Ryser and Markey, 2017; Reed, 2003, 2008). The upsets of repeated economic booms and busts in the period after 1980 drove a desperate search by both government and labour for the 'next resource' that could be exploited following the familiar post-war development model. Such an approach has not

proved successful because too many of the fundamentals that made the post-war model a success have changed – today, new models and new approaches are needed.

Expectations also extended to communities and residents. The post-war model in some resource dependent OECD countries often made local government one of the easiest of activities. The economy was being 'looked after' by a large externally managed firm/industry and the communities were comprised of many households with very large resource sector wages (Sundström and Hyder, 2008). The Keynesian inspired regulation/intervention and investment approach had at least three direct impacts. First, the intervention aspect meant that senior governments were directly involved in establishing the policy and infrastructure frameworks to support natural resource expansion, sometimes right down to planning and funding new town development. Second, the approach included ongoing public and private sector expenditures that fueled the post-war boom and set expectations about growth, wages, and continuity of work. Third, the investment approach funded and addressed quality issues in services such that rural populations now gained access to high quality services delivered under national standards. Such included schooling, healthcare, social services, welfare services, and the like which improved the quality-of-life and general well-being of resource communities. When job losses came, when closure happened, when services were regionalized or closed, communities lobbied for their return – a return that was now unlikely given the post-1980s policy transition by senior governments that had moved away from the regulation/intervention and investment approach. Expectations from the past, and the realities of the present, further exacerbate the challenges to small town capacity as they respond to environmental and energy transition and the shift to carbon-neutral economies.

The post-war development period also set up expectations around transportation and communication. The mobility of people, goods, and ideas – that had for so long been challenging for rural, and especially more remote rural, areas was no longer as limited. As described below, the fall-away of the Keynesian public policy approach of investment has meant that rural and remote places and regions have increasingly fallen behind with respect to the transportation and communication infrastructure needs of the 21st Century.

The post-war model continued, and in some places accelerated, economic and cultural harm to Indigenous peoples. The investment in new 'frontier' natural resource extraction projects by external 'colonizing' powers facilitated access to the resource base for industrial and multi-national firms, and to the land base for settler communities. These same actions displaced Indigenous peoples, separated them from their traditional territories, and limited their ability to exercise traditional activities on the land. Given the intimate connections between the land, the water, and Indigenous peoples, these impacts had devastating consequences (McDonald, 2016; OECD, 2019a; Royal Commission on Aboriginal Peoples, 1996). Over time, the cumulative impacts of multiple resource development sectors (together with the accompanying infrastructures and creation of non-Indigenous communities) on treaty and non-treaty lands have further limited Indigenous opportunities for economic development and continued to impact cultural connections to the land.

Of the OECD countries, the twelve with the largest Indigenous populations include Australia, Canada, Chile, Denmark (Greenland), Finland, France (New Caledonia), Japan, Mexico, New Zealand, Norway, Sweden, and the United States. A recent report noted significant gaps in several of these same countries between Indigenous and non-Indigenous populations with respect to life expectancy, child development, food security, and employment outcomes (OECD (2019a). In their study of Canada, Sweden, Greenland, Australia, Norway, and Finland, Horowitz et al. (2018) identify how marginalization is re-produced through weak legislation that still favours industrial development. Kuokkanen (2019), looking at Canada, Greenland, and Norway, adds how Indigenous people must still engage in processes and structures that were created by others with little reflection of the Indigenous context or the scope of impacts on Indigenous lives.

Post-1980s "retrenchment"

The global economic recession of the early 1980s marked a fundamental turning point for the rural places and regions of OECD member countries. This sub-section describes three sets of issues: the way in which global capital responded to the economic crisis, the way the crisis triggered a shift in how the state viewed its role in supporting rural places and regions, and the way the crisis did not shift the general public policy view of rural places and regions as resource banks.

The first of these issues had to do with the way in which global capital responded to the economic crisis. In general terms, the response was twofold. The first was to seek an expansion of capital's opportunities for investment, of the opportunities to access new sources of natural resources as basic inputs to the manufacturing economy, and of the opportunities to access new markets for the goods being produced. This path was pursued through expansion of trade liberalization and trade globalization (Waeyenberge, Fine and Bayliss, 2011), and changes to global economic policies such as the Global Agreement on Trade and Tariffs (GATT). Such allowed capital to relocate from high-cost production sites (which by definition include most OECD rural and small town regions) to low-cost regions of the world (Halseth and Ryser, 2018). It also allowed capital to export raw resources from those low-cost production sites back into developed economies.

Industrial disinvestment in this way, coupled with increasing competition from low-cost commodity supplier regions, and the increasing exposure of rural places in developed economies to ever more dramatic global economic swings, placed downward pressure on jobs in the rural places and regions. Recognizing that opportunities for rural development change across the spectrum of their location vis-à-vis proximity to urban/metropolitan centres, the more remote rural economies tend to be more impacted by the costs of distance from markets and limited by a narrower and specialized commodity-based economy (OECD, n.d.). The downward pressure on jobs was an outcome of capital's second response path. With the rise of competition from low-cost regions, natural resource industries adopted cost-minimization strategies such as the substitution of capital for labour, the creation of very high-efficiency production facilities, and the closure of small mills or facilities in smaller and more remote locations – all to reduce the cost per unit volume of commodity being produced (Halseth, 2016; Smailes, Griffin and Argent, 2019). For many resource-industry regions, the post-war experience with growth were replaced with job stagnation, a lack of economic diversification, incremental job losses, and outright economic sector loss through industrial and plant closures (Connelly and Nel, 2017a; Halonen et al., 2017).

A second issue is that the global economic recession also triggered a shift in how the state viewed its role in supporting rural places and regions. While the shift occurred at different paces in different countries, the outcome was replacement of a generally Keynesian public policy approach of investment and market regulation with a more neoliberal public policy approach favouring market de-regulation. This approach viewed rural investments as expenses such that dis-investment became the norm, and deferred rural service provision to market (read 'urban-centric') valuations of cost-effectiveness (Argent, 2017b; Harvey, 2005). The net result is that as the rural places and regions of OECD member countries entered a period of economic change, many of the public policy tools vital for supporting people, communities, and economies through transition were being closed, withdrawn, or underfunded (Connelly and Nel, 2017b).

As rural places and regions experienced successive economic recessions, and as their post-war economies contracted, the implications were widespread. Economic stagnation and job losses in established industries (whether they remained operating or not) meant that rural workforces were aging-in-place (Hanlon and Halseth, 2005; Skinner et al., 2014). A lack of new job opportunities meant that youth out-migration became a significant demographic force (Argent and Walmsley, 2008). State withdrawal from infrastructure investment and service supports not only meant a deterioration of local quality-of-life, but it undercut opportunities for re-negotiating place-based assets towards economic diversification and change (Markey, Halseth and Ryser, 2016). This cut into the 'readiness' of rural places and regions to respond to change, something that can be seen in the way that underinvestments in education impacted the readiness

of youth and limited their opportunities to enter a workforce that was increasingly requiring more technical and computer operating skills. The slowdown in critical infrastructure investments also occurred at the very moment that a new and vital player – the Internet – was establishing itself as the communications media of the 21st Century. This coincidence of timing left new information technology investments lagging significantly in rural places and regions – a lag that even 'catch-up' public policy initiatives have not been able to address (Kelly and Hynes, 2019).

Underinvestment in new information technologies in rural areas is a critical bottleneck for economic diversification, environmental and energy transition, and the shift towards a climate neutral economy. Whether it is the size of the 'market' to entice private sector providers to invest, or the financial capacity of communities to partner on national infrastructure cost-sharing programs, urban areas are better equipped to keep up with the cycles of new investments needed to keep economic development information and communications technologies (ICT) up-to-date and competitive. Take, for example, the movement to invest in rapid EV charging stations and provide an incentive for people to purchase electric vehicles. Rural municipalities are not in a financial position to partner and invest in rapid EV charging stations due to the loss of major industries and declines in their industrial tax base (see also Marsden, 2016; Wiśniewski and Kistowski, 2016).

Kelly and Hynes (2019) describe the market failure to provide broadband to rural regions in several OECD countries such as Canada, Ireland, and the UK. Unlike their urban counterparts, they argue that small communities are challenged by a smaller customer base that provides little incentive for private sector operators. This limits opportunities to integrate new technologies and innovations in rural businesses and organizations that need ICT investments in order to renew and transform these economies. For example, the forest sector is exploring the use of LiDAR with drone-based systems to support forest planning and monitoring operations in lieu of fieldwork (Goodwin, Coops and Culvenor, 2006; Tang and Shao, 2015; White et al., 2010). Health care providers have been exploring the use of digital health care with rural patients (Douthit et al., 2015; Salemink, Strijker and Bosworth, 2017). Deficiencies with rural ICT infrastructure and bandwidth strength, however, mean that technologies and innovations cannot be easily transferred to rural stakeholders. In Australia, the lack of certainty around rural broadband investments has affected the ability of small businesses to expand innovative technology aspects of their operations (DSDIP, 2013). New initiatives, such as the Digital Agenda in Europe, are being mobilized that recognize the role and value of ICTs to renew rural economies (Deloitte, 2014).

A third issue is the public policy view of rural places and regions. Where the government did intervene in rural economic development in the post-1980 era, it often did so with a vision of rural regions and rural development that remained 'stuck' in the early post-war period. In other words, it continued to view rural regions as a 'resource bank' (Markey et al., 2019) from which raw natural resource wealth could be extracted in large volumes and exported in relatively unprocessed forms to advanced industrial manufacturing centers. The costs to the natural environment of this approach remained relatively uncompensated. Further, while progress was made on addressing waste and pollution, the rural natural environment continued in its role as waste sink for the economy and for urban concentrated populations. Disconnect through government retrenchment, the closure of offices in rural regions, and that many of the young people heading into the civil service had grown up in metropolitan regions all mean that policy makers increasingly have only limited personal experiences with rural places and less direct contact with what was happening 'on the ground' in rural regions. Responding to accelerating rural change, the desires of rural communities to be more involved in their own development planning, and the need to coordinate policy and investments decisions across multiple levels of government and the private sector, all helped support interventions such as the European Union's LEADER Programme (Bosworth et al., 2016; Petrick, 2013; Sherry and Shortall, 2019) that have reoriented community and economic development towards a more place-based approach to renewing rural regions (Argent, 2017a; Carson, 2011).

When the last two preceding points are taken together, we identify that another implication of this retrenchment period is the rural memory of 'abandonment' by senior public policy actors and corporations (Fuller, 2016; Kotilainen et al., 2017; Wenzelburger, 2011). As we approach environmental and energy transition, rural communities and regions are likely to greet assurances from senior governments regarding statements of support, just transition, etc., with a tremendous amount of skepticism. This is another legacy of the post-1980 period that will affect the manageability of transition.

A further implication is that in many of the 12 OECD countries with large Indigenous populations there continued a 'business as usual' approach to addressing Indigenous concerns on the part of senior governments or major industries. However, significant shifts in the organizing and mobilization efforts of Indigenous peoples, aided by court victories, thrust Indigenous rights, title, and treaty issues to the forefront of land use debates in rural regions. As noted in a recent OECD (2019a, p.212) report, such cases have clarified governments' duty to consult in good faith around issues of land and development towards obtaining "free, prior and informed consent". It has motivated attention towards larger relationship building processes that build understanding and can lead, for example, to greater consideration of traditional uses and rights in planning. While this did introduce uncertainty around resource development, it also motivated governments and industry to engage with Indigenous peoples to reach resource use and management agreements (Fidler et al., 2007; Maclean, Robinson and Natcher, 2015; O'Faircheallaigh, 2013; Trigger et al., 2014). Self-governance frameworks have, for some Indigenous communities, reorganized land and development rights to give those communities more control and greater access to a range of derived benefits, including fiscal. Examples include mining and sub-surface rights for the Inuit in northern Canada, commercial fishing quotas for the Maori in New Zealand, and fishing and hunting rights as cultural practices for the Sámi in Sweden OECD (2019a).

Post-2008

The economic downturn that began in 2008 reinforced and exacerbated some of the general economic and social changes occurring in rural regions. Pressure on capital markets limited new investments in needed infrastructure and development projects, the voluntary sector (which had acted to fill the void of public service withdrawal) struggled as private sector supports were reduced, and governments were often left with a limited and uncoordinated suite of policy options after years of neoliberal policy shift. Resource dependent regions with a narrow range of products, and a limited market, felt even more fully the vulnerability of their tradeable sector exposure.

In the post-2008 era, rural places and regions within OECD countries face the future with both the legacies of past development trajectories and the imperatives of changing environmental and energy paradigms. They confront this collision of past and present with a public policy framework that can at best be described as uncoordinated and chaotic (Markey et al., 2019). While the Keynesian public policy approach was largely discarded in favour of a more neoliberal public policy approach, the inherent contradictions and failures of the neoliberal approach had been laid bare on multiple occasions (Harvey, 2005). In response, governments are at times 'doubling down' on the neoliberal agenda of privatization and market liberalization, and at other times embarking on a re-regulation of market segments and direct government intervention in either markets, industries, or even individual firms (Baldwin et al., 2019; Connelly and Nel, 2017b). All the while, the public policy view of rural development as a resource bank is only shifting slightly – a view that is not assisted in changing by national media that are concentrated in metropolitan centers.

In addition, the post-1980s trends continue with respect to economic and community change. Industrial closures, job reductions through automation, workforce ageing, population decline, youth out-migration, service regionalization or outright closure, infrastructure deterioration, and lagging investments in new information technologies all challenge the capacity of rural places and regions to respond to the new rural economy (Halonen et al., 2017; Ryser, Halseth and Markey, 2018, 2019a; Townsend, Wallace and Fairhurst, 2015). There is also a re-emergence of significant disparities been rural regions as market forces

push demographic and other changes. Despite examples of a better way to support and strengthen that new rural economy, it remains a challenge to take up the new imperatives embodied within shifting paradigms around community development, the economy, the environment, and energy. In terms of community development, the post-war demands for jobs – with limited attention to impacts on the environment – has given way to an understanding that work must fit within a broader and better construction that involves the social, cultural, environmental, and other values of the region. There is also recognition that employment opportunities need to support a quality-of-life for both people and communities. Economic development and growth for their own sake is now tempered by linking the idea of development to its social, cultural, environmental, and other impacts. In the OECD's (n.d.) Rural 3.0 policy framework for rural development, this broadening of an understanding of progress and well-being includes a move towards improving rural quality of life, quality of environment, and quality of the social and natural capital that is available to support future development. A re-investment in community development supports to all rural people regardless location fits with the Rural 3.0 framework goal of ensuring more just equality for rural regions and rural peoples.

The environmental paradigm has also undergone a tremendous shift. From thinking of the natural landscape as an undeveloped 'space' and a near limitless 'cache of resources' to be exploited for economic benefit, our understandings of the limitations and cumulative impacts of economic development on environments and ecosystems – from local to global – has shifted. There are now calls for more harmonious, less invasive, more respectful, and more efficient engagement between economic development and the natural environment (Gillingham et al., 2016; Howard, 2017; Robins, 2018). Further, the historical view of the environment as a waste sink with no limits has been falsified by numerous demonstrations of clear limits and how our actions are oftentimes exceeding those limits. All sectors are taking this paradigm change seriously. New economic actors seek to reduce their environmental footprint, while even established economic sectors are investing heavily to reduce their impacts (Ahmad et al, 2016; Barth and Melin, 2018; Giurco and Petrie, 2007; Yang, 2013). New natural gas production plants, for example, have reduced emissions and energy use while at the same time they have increased the extraction of more valuable products per unit volume extracted than ever before (Canadian Association of Petroleum Producers, 2018).

Concomitant with other societal shifts supporting environmental transition, in many of the 12 OECD countries with large Indigenous populations the increasing influence of Indigenous peoples on land use decisions, and their exercise of more significant levels of outright land use control via treaty settlements and the like (Pedersen, 2015) has also impacted environmental management in favour of more sustainable modes of production through to outright conservation. A more authentic engagement with the impact of colonialism on Indigenous peoples has built greater understanding of the impacts of the past, the healing needs of the present, and the need to create Indigenous-led opportunity in the future (The Truth and Reconciliation Commission of Canada, 2015; UNDRIP, 2007). Rural areas are increasingly providing "vital new functions … [including] … rural tourism, the preservation of wildlife and cultural heritage sites, the production of renewable energy, and the recognition of the key role that the rural environment plays in ecosystem services, such as carbon capture or filtering contaminants from air and water. These are all areas where Indigenous communities can take advantage of context-specific immobile assets that can represent areas of absolute advantage" (OECD, 2019a, p.146). As with all rural communities, such opportunities are also impacted by proximity to urban/metropolitan areas as well as relative accessibility/remoteness.

This leads into the shifting energy paradigm. As described earlier, rural places and regions developed in the post-war period under the fossil fuel paradigm. Fossil fuels supported economic expansion, supported the transport of resource commodities from remote regions to markets, and supported the transportation and home comfort needs of resource frontier and urban communities alike (Hreinsson, 2007). Fossil fuels were also the target of resource development as remote new sources were accessed and brought into the energy supply chain (Chevron Australia, 2016; Kotilainen et al., 2017; Woodside Energy Ltd., 2016). Fossil

fuels also played key roles in the construction and development of other rural energy sources such as hydroelectricity projects and mineral resources for everything from nuclear power to rechargeable batteries.

But of course, this energy paradigm is changing. It is not changing because people and economies are using less energy – yes, they are generally more efficient at their energy use – it is changing as the environmental costs of the post-war energy paradigms are becoming more clear. The shift towards more carbon-neutral economies includes alternatives and choices in energy sources and uses. These shifting energy paradigms are shifting opportunities in rural places and regions.

As with environmental and energy transition, the shift towards a more low-carbon or carbon-neutral economy poses implementation, management, and policy options that will need to navigate between opportunities and challenges. The research literature is already adding case studies that can inform policy direction. For example, Kitchen and Marsden (2009) draw upon their work in rural Wales to describe a community owned wind turbine in the Snowdonia region that is helping a number of small communities via through household electrical energy production.

Of course, most large solar and wind power developments are not community owned. Delicado, Figueiredo, and Silva (2016), for example, note that roughly one-third of municipalities in Portugal have a windfarm or photovoltaic solar power plant. These state or corporate initiatives have been subsidized to varying degrees by public funds and yet public participation and engagement in the planning and development processes has been largely absent and the benefits accruing to rural communities are often limited. Following the thread of public consultation, Lennon and Scott (2017) report on wind farm proposals in Ireland, designed for energy export, that are opposed by residents who feel left out of consultation and worried about land evictions, noise, and impacts to rural landscape aesthetics.

Poggi, Firmino, and Amado (2018) have looked at solar/photovoltaic energy and wind energy projects in Portugal that bring these policy opportunities and concerns together. Their examples highlight opportunities for new rural economic activity and wealth generation, and green power both locally and for metropolitan Lisbon. But they also note the loss of pine forests and orchards – a ‘dark side’ to green energy in the competition for rural land. In Denmark, Rudolph and Kirkegaard (2018) document a controversial practice of using the rhetoric of rural decline to legitimize the acquisition and demolition of rural properties to support wind farm development.

The ‘new’ rural economy

The context for environmental and energy transition, and the shift to more carbon-neutral economies, is the ‘new’ rural economy. This section of the working paper provides some background on that new rural economy and how it is similar to, and different from, the post-war rural economy. In terms of similarities, the new rural economy remains embedded in the wider global economy. This is, of course, not a new phenomenon. This links to a second point of continuing similarity, the reliance upon local and regional assets as the foundation for an export economy, the generation of wealth, and support for local and regional quality-of-life. While there are some base similarities, it is important to sketch the differences – to understand what is new in the global economy and what the impacts are for rural places and regions.

In terms of differences, global interconnections are increasing and they are increasingly complex. As a result, the pace of change in the global economic system is accelerating. Actions in one location in the global economy are quickly transmitted throughout the system. As a result, rural places find that economic upswings may come faster, and economic downswings become more unexpected and may go deeper than previously experienced (Fernando and Cooley, 2016; Ryser et al., 2014). Not only is industry and capital global in scale and scope, but it is increasingly mobile. Rural places find themselves not only competing with one another for capital investment (Petrick, 2013), but they also find themselves competing for their share of the jobs that might go with that capital investment – a linkage that used to be automatic

but is no longer. In contrast to the mobility of capital, labour remains relatively fixed. Although it is becoming more mobile itself through processes such as long distance labour commuting (Haslam McKenzie and Rowley, 2013; Ryser et al., 2017a), the majority of rural labour remains relatively fixed in places and much slower to respond to economic change and challenge than capital.

Another shift is the transition from a comparative advantage economic approach to a competitive advantage economic approach (Barca et al., 2012; Headwaters Economics, 2012; Ryser and Halseth, 2010). If both high-cost and low-cost producers can get the same natural resource commodity to market at relatively similar prices, the question is how can high-cost producing regions shift their orientation to create competitive advantage. One way is to shift from commodities to a mix of economic products including commodities, services, and other values. This shift in approaches has led to increasing attention being paid to the potential for place-based community and economic development (Horlings and Kanemasu, 2015; Ryser et al., 2019b). There is a well-established record of the value of place-based policy in supporting such development. In this case, local assets need to be re-imagined and then re-bundled in ways to create competitive advantage and in ways that meet the aspirations of local places in terms of their desired economic, community, cultural, and environmental returns (Shucksmith, 2018). Environmental and energy transition has the potential to fit well with place-based approaches through underlying changes in thinking towards more sustainable development that respects both people and the environment. It also has the potential to fit well as assets are re-imagined towards green energy generation and circular-economy uses of natural resources (Mathijs, 2019; Peltre, 2019). However, as will be described below under challenges, change in traditional economic sectors can create stress and worry that may lead to calls for a return to former development models rather than embracing the possibilities of environmental and energy transition. To undertake this shift in approaches, communities and regions need to know where they want to go with respect to social, community, and economic development.

The competitive advantage and place-based assets approach also has to do with changes in the volumes of rural exports. Historically, the model was of exporting large volumes of low-value commodities – commodities that produced reducing returns over time from the ‘price-squeeze’ processes of competition and product substitution. The opportunity now is to focus on the quality of the export. In several northern forest regions, commodity lumber production is being replaced by the distillation of essential oils – the former using vast numbers of trees to produce a low-value product with an increasing small workforce, while the latter is using a small number of trees to produce a very high-value product with an relatively large workforce (Kelkar et al., 2006; Stern et al., 2015). As will be detailed below, place-based approaches to community and economic development provide rural places and regions with the potential to identify their niche, add value, and exploit opportunity.

Because of these trajectories within the global economy, the question for rural development is clear: if capital can be ‘anywhere’, why would it come to your place? The considerations that come from this increasing mobility within the globalized economy are many. For example, to what degree do communities want to bind themselves into the global economy, with some clear recognition that the deeper the connections the greater the potential impacts as the global economy changes and shifts? How do the imperatives around environmental and energy transitions create limits on old, and possibilities for new, community and economic development pathways? Such questions put increasing pressure on rural capacity to ask and consider the questions, the options, and the community and economic development alternatives. Such consideration is not a one-time engagement or activity – it is not about creating a ‘fire and forget’ community and economic development strategy. The pace of change within the new rural economy means that those places and regions that do develop successful pathways must continue their work and vigilance in identifying future opportunities that will support further diversification and adjustment even as the global economy itself continues to shift and change.

The OECD's (2019b) guide to rural policy principles highlights how sector specific or limited polices can generate unexpected negative outcomes as they impact various 'places' differently. Instead, they stress the need to recognize that all policies have spatial consequences and thus need to adopt a place-based orientation. They also identify how the functional geographies of rural places and regions (for example their situation and interconnectedness with other rural or urban areas) influence both the needs of those places for policy supports and the types of policy supports that would be most effective given local capacities. Taking this approach, the OECD's place-based rural policy guides highlight the importance of creating supportive top-down public policy that is more place-based and aimed at sustainable and inclusive development. This places increasing importance on place-based policy and the need to support capacity within small places and regions so that they can effectively engage to develop place-based approaches as well as the partnerships and collaborations needed to realize the potential of those approaches. We need to think carefully and critically about what our assets are in the new global economy, how they can create competitive advantage in the new rural economy, and how both fit with the aspirations or rural places and regions.

Trajectories impacting environmental and energy transition

While the paradigms are shifting with respect to environmental and energy issues, transition for rural places and regions is impacted by a wide range of trajectories. In some cases, these trajectories assist, in others they limit, the ability of those places and regions to respond.

Economic

One critical trajectory is with regard to the legacy of economic development within any particular region. Resource industry development has been undergoing significant restructuring through processes involving time and space compression, increased global competition, and the continuing need for profitability on the part of capital (Edenhoffer and Hayter, 2013a). Where natural resource production persists (and will persist) in OECD rural regions, continuing producers are addressing their profitability concerns through processes that involve the substitution of capital for labour, increasing the 'price squeeze' on contractors, and focusing on their core business activities. In some cases, the focus on shareholder profitability appears to be supporting an investment strategy where firms are 'running down the assets' in their historical production regions and transferring profit to new operations in low-cost production regions (Markey, Halseth and Manson, 2008). In other cases, firms are trading off the value of industrial production facilities versus the value of the commodities being produced by those production facilities. While its face may be changing, the imperatives of capital to generate profit remain unchanged.

Socio-political

The trajectories of political change also impact the capacity of rural regions to respond effectively to transition. As noted, the transition from a Keynesian to a more neoliberal public policy approach has reduced the capacity, services, infrastructure, and other resources that those regions would rely upon in order to successfully engage with the debates necessary to mobilize place-based community and economic development approaches (Marsden, 2016; Tonts and Haslam McKenzie, 2005). Neoliberal policy deferral to market processes has also limited government investment in rural areas, and reduced support for local and regional development planning activities despite calls by those same governments for rural places and regions to take more 'ownership', and to be more 'entrepreneurial', in their community and economic development planning (Herbert-Cheshire, 2000; Herbert-Cheshire and Higgins, 2004). In the current period, as described above, policy incoherence has made the implications of political change even more challenging for rural regions.

Social, cultural, and demographic changes further complicate transition for rural places and regions. In terms of social change, the globalization of culture and changing expectations around needs and wants have fuelled pressures for greater connectivity and significantly impacted the relative attractiveness of different types and sizes of communities. The ageing baby boom population is further changing investment and policy priorities at the national and local levels (Glasgow and Brown, 2012; Skinner and Hanlon, 2016). In those 12 OECD countries with large Indigenous populations, the need to address the circumstances of those populations, which also have significant proportions of young people, remains a pressing policy and development matter (Maru, Fletcher and Chewings, 2012; Mitrou et al., 2014). As noted in a recent OECD (2019a: 4) report:

> *Indigenous peoples have to confront and overcome histories of discrimination, loss, and dispossession. European settlements, for example, severely shrunk and permanently altered the land and resources available for Indigenous peoples to sustain their traditional economies. Dependency relationships with states and religious institutions further resulted in Indigenous economic activities being determined within a framework set by non-Indigenous peoples. As a result, the capacity for Indigenous peoples to set their own development pathway was diminished, negatively affecting their wellbeing, language and culture.*

This links to concerns about the impacts of development on community, social, and cultural well-being, as well as to the exercise of Indigenous rights and title.

Institutional

Lastly, trajectories around institutional change and institutional capacity are further challenging rural places and regions as they address these transitions. While senior levels of government may be devolving activities to more local levels of government, they often devolve those activities without similarly transferring new fiscal and regulatory powers (Douglas, 2005; Tennberg et al., 2014). Thus, as local governments divine new community and economic development pathways around environmental and energy transition, they often lack the financial resources to invest and lack the jurisdictional authority to make the critical decisions that will enable that path (Greive and Tonts, 1996; Martin and Sunley, 2006; Ryser et al., 2016).

Within most rural communities, the voluntary and not-for-profit sectors are also an important part of the institutional landscape, and an important part of the framework for communities re-evaluating assets, re-imagining competitive opportunities, and matching those with aspirations (Ryser and Halseth, 2014; Ryser, Halseth and Markey, 2019a). Population ageing, out-migration, and the loss of professional staff through the closure of government and private sector services have all negatively affected the voluntary and not-for-profit aspect of the institutional landscape of these places and regions.

Specific challenges to environmental and energy transition in rural areas

In addition to the trajectories just described, there are some general and specific challenges to environmental and energy transition for rural places and regions in OECD countries. These include its limited economic base, services and infrastructure, community skills and capacities, public policy and investments, and the ‘stickiness’ of traditional ‘uses’ of energy and the environment in rural economies (Phillips, 2019).

Limited economic base

Many rural places and regions encounter change with a narrowly constructed economic base. This limits opportunities and increases vulnerability. Some of the general factors influencing business performance in rural areas include longer distances to markets, the small size of local markets, limited access to market/product research and development, reduced access to needed workforce skills or support services, and access to capital (OECD, 2016b, 2017, 2019a). All of the factors sum to increased costs and barriers. As well, the uncertainty generated by change can drive a desire to protect the limited economic base that they do have. For example, when a dependent industry sector is challenged, communities often mobilize in a political environment seeking assistance to renew the industry even though its long-term potential may not be enhanced and further disruptions are likely to occur in the near future. This creates a drag on processes of environmental and energy transition. This desire to protect an established economy, or established way of powering that economy, can also create opposition and barriers in the shift towards more carbon-neutral economies.

A related challenge is the wider culture of consumption that puts intense pressure on natural resource production. When coupled with the currently limited efforts at achieving a full-life-cycle (or circular economy) of product development, manufacturing, use, and recycling, this creates further energy demands and waste.

Services and infrastructure

Infrastructure and services are another specific challenge for rural places and regions. As noted earlier, the historically developed infrastructure and services, while suited to the natural resource-based economy of the post-war era, have not received the investment required to both modernize and maintain their utility for supporting community and economic development. Infrastructure and services are not being retooled at a rate necessary for the new rural economy, the quality-of-life expectations of rural residents, and the information-communications demands of the global economy. Factors affecting the cost and availability of rural services include distance, low population, low population and development densities, an ageing population, diminishing subsidies, and the presence of few service providers (OECD, 2016). Such limitations create bottlenecks for transition and limit the ability to retain and attract economic development as well as workers and their families.

Community skills and capacities

As noted, rural communities are challenged by the range of skills and capacities available to support environmental and energy transition. Having a small population by definition limits their capacity to take on all of the tasks associated with ‘bottom-up’ and place-based development. Communities with a limited economic base will have skill sets defined by the needs of that economic base. Further, distance from urban and metropolitan centres may also limit the exposure of the community to innovative opportunities and possibilities associated with transition.

Available skills and capacity are also challenged the processes of worker and resident mobility and immobility (Ryser et al., 2017b). Already identified are numbers of forms of mobility including youth out-migration, population out-migration after the collapse of a local industry or closure of local services, as well as processes associated with long distance labour commuting (LDLC). LDLC has a serious impact on local capacity when large numbers of residents are routinely away from the community for long periods of time. Equally important in the debates about environmental and energy transition are processes of immobility. What are the factors that cause rural residents to remain in place, what are the characteristics of those populations, how do processes of transition affect and impact them, and what forms of policy interventions are needed to safeguard vulnerable populations and support the robust populations already hard at work on place-based community and economic development?

Public policy and investments

Public policy changes further complicate the capacity of communities and have generally had a negative impact on readiness for environmental and energy transition and the shift towards a more carbon-neutral economy. The neoliberal policy turn and state withdrawal has reduced the services and skills base in smaller and more remote rural communities. As noted, reduced investments have left key infrastructure lagging the needs of the contemporary economy. Further policy challenges in transition supports include co-ordination across different levels of government, administrative (topical or area of application) gaps, policy gaps via fragmentation, capacity gaps in government delivery, asymmetries in information (quantity, quality, type) between stakeholders, and challenges ensuring transparency in support or development program application (Charbit and Michalun, 2009)

Turning this challenge around is problematic given that rural places and regions are often 'invisible' in national debates given that the media centers for most countries are located in urban and core areas. As a result, rural regions only appear in that media when there is a local crisis. Another problematic aspect of this invisibility is that it can create or perpetuate misunderstandings and disconnect – for example, the disconnect between urban and rural populations in their understandings of, and conceptualising solutions to, climate change through environmental and energy transition.

Traditional 'uses' of energy and the environment

Finally, one of the biggest challenges associated with the energy transition concerns the continuation of traditional patterns of environmental and energy use in rural places and regions. While paradigm shifts for both have been noted, many rural regions still contain natural resource producing industries that extract large amounts of resources in a relatively uncompensated way from the natural environment, use that natural environment as a waste sink, and remain tightly linked to the fossil fuel economy. Embedded within these traditional patterns are wage and job expectations in rural regions. To support change towards more carbon-neutral activities in current economic sectors, the addition of new economic sectors, and more a general economic transition, there is a need to create opportunities that measure well against the historically high-wage natural resource sectors. Associated with employment 'norms' and an historical division of labour in rural regions are the constructed identities – particularly masculine identities – of residents that are bound up still in the post-war development paradigm (Major and Winters, 2013; Paasi, 2013; Skinner and Winterton, 2017). Transition is always challenged when local infrastructures, services, workforces, and community social and political institutions and expectations are oriented towards the pre-existing economic structure.

Taken together, these challenges highlight one of the key messages of this working paper: that rural places and regions will need to be supported and presented with concrete policy and funding commitments that support communities and workers through environmental and energy transition. For workers to integrate successfully into new job and sector opportunities arising from this transition, supports for the identification of transferrable skills, and accessing re-training where necessary, will be needed. These require national level programs and supports that are both responsive and well-coordinated with existing employment support systems. Given that some groups of traditional sector workers, and indeed some rural regions, may report relatively low levels of background education, such investments may be long term but their delivery will reduce stress and resistance to transition. For new workers, national educational policy must be tooled to fit the needs of the mid-21st Century economy and educational/skills training investments must support, first a learning workforce, and then the processes of life-long learning. As noted in the OECD's Rural 3.0 framework (n.d., p.10):

Territorial inequalities can contribute to political discontent which reduces the capacity for countries to build the consensus necessary to address structural policy challenges. Traditional policy solutions based on the assumption that people will move, or that regional policies are a deadweight that redistributes wealth from richer to poorer regions do not provide sustainable solutions. Place-based rural development policies will be critical to delivering on the promise of the Sustainable Development Goals that ‘no one is left behind’.

In this, there is an also a role for rural communities as they need to assist with shifting worker, workplace, and community identities to embrace environmental and energy transition rather than try to hold on to former economies.

3 THINKING THROUGH TRANSITION

This section raises some conceptual and practical considerations impacting environmental and energy transition. It is comprised of three subsections. The first reviews a series of theoretical debates around resource development in rural transition. The second reviews some of the practical approaches being applied to community and economic development in rural regions. The final section poses some key questions with respect to rural regions and the environmental and energy transitions they are working through.

Debates within the theoretical literature

Background to the current attention accorded to the environmental and energy transitions that are facing the rural places and regions of OECD member countries has been well developed within the academic literature. To start, the natural resource-dependent focused development paradigm of the immediate post-Second World War era has been clearly detailed and critiqued with respect to both the opportunities and limitations that are created and perpetuated. From Staples Theory through to Evolutionary Economic Geography, there is recognition that this post-war development was a historically contingent growth period. The need for jobs to rebuild war-shattered economies and the need for a new scale of natural resource production to feed into the new scale of global manufacturing capacity, fit well together. That countries now comprising the OECD were both the natural resource supply warehouses, and the home of the post-war manufacturing capacity, completed the fit that supported a successful public policy period.

Staples Theory and Evolutionary Economic Geography

The limits to natural resource development for rural places and regions has been well detailed within the literatures linked to Staples Theory and Evolutionary Economic Geography (Chapman, Plummer and Tonts, 2015; Ellem and Tonts, 2018; Taylor et al., 2011; Tonts, Argent and Plummer, 2012). To start, as 'price taking' resource exporting regions, they are dependent upon global market demands and prices for their commodities (Markey et al., 2019). The long boom of the 1950s to 1970s hid this frailty, but past economic patterns resurfaced after 1980 and have accelerated since. The increasing liberalisation of markets has made more acute the dependency impacts on rural economies because they are more trade exposed.

Resource dependent regions have also suffered as a result of 'truncated development' (Halseth et al., 2014, 2018). This limitation develops from the notion that the global capital invested in natural resource production regions will not extend its investment up the value chain as these types of investments already exist within manufacturing centers. Global shifts over the past decades in the locus of global manufacturing centers have made capital even more mindful of where to make its manufacturing investments. The result is that resource-producing regions remain just that – resource-producing regions (Argent, 2013).

A third element in the critiques offered by Staples Theory and Evolutionary Economic Geography has to do with the previously mentioned growth of competition from low-cost producing regions. As capital fights to remain competitive, it seeks concessions from governments, communities, and labour (Affolderbach,

2011; Horsley, 2013; Prudham, 2008). These concessions further expose the narrow basis and focus of local economies as available fiscal supports and levers are tapped to support existing older industries (Martin, 2014). As the globalization of the economy has deepened, these dependencies and the impacts of truncated development limit local capacities to diversify – especially in cases where potential natural resource sources that could support economic diversification, such as forest ecosystems, have their access and use limited by existing long-term lease, rights, or ownership agreements granted to the older industries.

Institutionalism

Contributing to the challenges of shifting away from an older economic framework to a more diversified economic framework is well described in the 'Institutionalism' literature (Amin, 1999; Halseth et al., 2014; MacKinnon et al., 2009). For many writers, the focus is on the institutions that structure social and economic life in both time and space. This attention "also seeks to interpret structure in terms of historically and socially embedded institutions, seen to evolve slowly, often unpredictably and sometimes inefficiently" (Amin, 2009, p.386).

Institutionalism recognizes that institutional structures are socially constructed and include both formal regulations and organizations as well as informal practices, routines, and habits. Together, these shape the behaviour of different types of actors. Formal regulation can include laws, policies, standards, and rules while informal practices are impacted by networks, habits, norms, routines, and customs (Streek and Thelen, 2005). As such, the make-up and mix of informal and formal institutions are rooted within places and regions (Boschma and Martin, 2010). As such, institutions (however conceptualized) cannot be divorced from the culture, history, or society under which they formed (MacLeod, 2001a). This approach to understanding rural economies, and change within those rural economies, takes a broad view of economic activity, economic actors (firms, governments, organizations, individuals, etc.), and the different imperatives driving change (such as our concern here with environmental and energy transitions).

Through this theoretical lens, places and regions take prominence as meeting places for a variety of global and local institutions and the conflicts, relations, and discourses that shape, constrain, or transform the economy, society, and culture (Paasi, 2009). Variation across regions is expected, and the development of regional economies in the future will follow different trajectories depending in part on their inherited legacies and in part of the way they might engage with re-imagining local and regional community and economic development assets (Peck, 2005). New institutions are built, or layered, upon existing institutional arrangements.

In the case of OECD rural regions, it is recognized that decades of engagement with specific natural resource industries, and their unique needs, practices, cultures, and activities creates a rigidity to change (Martin and Sunley, 2006). It is difficult to work through processes of change towards a new and more carbon-neutral economy when a government's fiscal regime, the region's transportation networks, the local labour training and supply, the local and regional community and government regulation, the sense of identity and pride for both communities and individuals, and even the annual length and timing of family vacations is tied to the structures and rhythms of older industries (Edenhoffer and Hayter, 2013b).

The combining of Evolutionary Economic Geography with Institutionalism does, however, highlight that shifts and changes are possible – indeed, they are constantly occurring (Hayter, 2008; Simmie and Martin, 2010). The natural resource industries active today across the rural areas of OECD countries are significantly different from the industries that first emerged in those same areas in the 1950s or 1960s (Argent, 2017a; Connelly and Nel, 2017b). Therefore, if the theoretical literature points to the importance of continuing change, and communities and regions themselves have long experience with process of change, then the potential for managing our way through environmental and energy transitions does exist. For Hayter (2008), particular arrangements of government policy and regulation, corporate ownership and management structure, global market conditions, and the available harvesting/extracting, processing, and

transportation technologies together form discrete techno-economic paradigms. Allowing for evolutionary change over time, such techno-economic paradigms shift over time as changes occur within these different arrangements.

Techno-economic paradigms

Linking ideas that coalesce within Evolutionary Economic Geography with the attention given to managing 'structures' found in Institutionalism, are the roles that 'techno-economic' paradigms play in supporting historically contingent modes of capitalist production, and how changes in those techno-economic paradigms support periods of change and restructuring in those modes of production.

With a focus upon the restructuring of natural resource industries, specifically forestry, Hayter (2000, p.5) has described in detail the role of techno-economic paradigms:

> *Emerging techno-economic paradigms center on major new technologies that have pervasive effects throughout the economy, creating new forms of production and engineering principles, new organizational arrangements, and government economic and social policies. … The rationale for a shift in the techno-economic paradigm occurs when new forms of production, technology, and engineering principles (and institutional arrangements) offer substantial improvements in productivity over prevailing systems and ways of thinking, especially if the benefits of the latter have more or less 'played themselves out'.*

Such rationales for changes and shifts not only impact the technology being employed within the production process, but they have wider implications. As described by Hayter (2000, p.8),

> *The technological changes associated with each techno-economic paradigm are paralleled by new regimes of regulation and institutional innovation involving new forms of business organization, research and development (R&D), and labour relations, as well as macroeconomic government policy initiatives and even new ways of organizing the international economy.*

From coal-steam or silicon chip-computer technologies, techno-economic paradigms include the technologies per-se as well as the social and political structures needed to support that technology arrangement – for some these are the more familiar 'system innovations' that bridge the social, political, economic, technological, etc. and have the potential for leveraging transformative change. As Halseth and Ryser note (2018, p.96), "not only are techno-economic paradigms time and place specific, but they also embody an imperative for change through the competitive processes of the economic market working over time". While these have always been part of the theoretical debates around rural and natural resource development, the techno-economic paradigm approach foregrounds the role that technologies can play in producing radical and rapid change. Such is likely the case with shifts to more carbon-neutral economies that are part of the environmental and energy transition reshaping rural places and regions.

These changes and shifts through the transition to new techno-economic paradigms are thus both extensive and pervasive. They create both crisis as well as opportunity as old systems and institutions (structures as well as the organization of both economic and political power) are dismantled and new ones created. Together, the literatures on Staples Theory, Evolutionary Economic Geography, Institutionalism, and techno-economic paradigms identify the processes that create rigidity within economic systems while at the same time identifying that change to and within those very systems is always underway (Hayter, Barnes and Bradshaw, 2003; Hayter and Edenhoffer, 2016; Kunkel, 2017; Sandlos and Keeling, 2016; Tonts, Argent and Plummer, 2012). They identify the need to locate the legacies and trajectories of past development paradigms that need to be renovated or replaced, and the imperatives being generated that are creating the impetus for change. Environmental and energy transitions are underway and are already generating the imperatives for change. The shift to a more carbon-neutral economy is bringing technologies (through techno-economic paradigms) specifically into the theoretical debate. This allows for the identification of some of the barriers and forces that act as a 'drag' on the processes of change (such as sunk investments in technologies and the supportive social-economic-political structures) but also the

opportunities for substituting new technologies to create change in both investment and policy. As processes of environmental and energy transitions drive a greater imperative for change, these theoretical frameworks also remind us to refocus attention on rural places and regions for that is where the techno-economic paradigms associated with resource development and energy production are themselves located.

These theoretical foundations establish the increasingly tenuous nature of our historically constructed natural resource industrial approaches towards energy and the environment. They also clearly enunciate that not only is change possible, but it is a normal and necessary element of our economic and social systems. Together, these results circle back to the need for a replacement of a space-based community and economic development approach with a place-based community and economic development approach, and a replacement of a comparative advantage framework with a competitive advantage framework (Halseth and Ryser, 2018). For rural places and regions, the opportunities of environmental and energy transition are that they provide an imperative to the long-gestating need to get on with these more general replacements in development approaches. They provide the imperative to re-imagine local assets, to re-bundle them in new and creative ways to create more local wealth, and to match those opportunities with local aspirations for community and economic development.

Practical directions important to environmental and energy transitions

Beyond the theory, there are also practical directions important with respect to environmental and energy transition. To start, there is a need to revisit the debates between community development and economic development. As with debates between the economy and the environment, these have for too long been cast as isolated solitudes where support of one must come at the expense of the other. In the immediate post-Second World War economic development paradigm, we find clear evidence that community development and economic development were intimately intertwined for rural communities and regions. As we look forward, there is a need to re-connect these two imperatives to support the synergies between healthy places and healthy economies that can generate new economic opportunities and ground them upon a quality-of-life and a quality-of-place that itself creates new social and economic development potential.

A place-based community and economic development approach

Bringing community and economy together grounds the emergence of a place-based development approach. This recognizes that development is not only socially embedded, but that social capital can in fact influence economic performance. It also recognizes one of the key shifts in the competitive framework of the global economy that is having significant impacts in rural places and regions. As ‘space’ is becoming less important in the global economy as a result of communications and transportation technologies, ‘place’ is becoming more important. Places are the meeting points for both global and local activities, policies, investments, and institutions. There is an interconnectedness that happens only on the ground in places. This surfaces the importance of recognizing that the social, economic, and political systems are embedded in locales that are themselves embedded within an environmental system. This focus on place also reminds us of the critical need to understand the role of rural places and regions in environmental and energy transition; to understand the impacts that such will have in those rural regions; and the possibilities they will create for rural places which themselves are also adjusting to economic, demographic, social, cultural, and political change.

The shift in community and economic development towards more place-based orientations does continue and recognize an economic focus, but now it incorporates a greater consideration of issues related to culture, environment, and community. A place-focused approach supports a greater diversity of values, and understanding of values, in order to create both social and economic benefit. As noted earlier, a place-based approach re-imagines assets and links them to aspirations. It also links them to emerging energy

transition opportunities at the local, regional, continental, and global scales where rural regions can play a bigger role in green energy generation and the shift to more carbon-neutral economies. Much of that energy generation will be in the form of electricity and as such will require investments into new forms of collaboration and governance to manage the up- and down-stream segments of the new energy platform.

These processes of place-based development are not easy. They require more attention to reinvestments in the local social, economic, and cultural infrastructure as locations for economic development unto themselves. They also include a new focus on learning, capacity development, and innovation as these are the foundations needed to engage with the rapid pace of change in the global economy. Finally, they also entail a greater consideration of the neighbouring relationships, and in those 12 OECD countries with large Indigenous populations the specific rights and title claims of Indigenous peoples (OECD, 2019a). If rural places are better equipped with skills, and a new capacity for innovation, they will also be better equipped to engage with environmental and energy transitions. Workers need new skills, communities need new infrastructure, resource and energy industries need support as they retool towards green and circular economy paradigms. Attention to the unique circumstances of place can support more efficient deployment of these supports.

A challenge for place-based approaches is the need to balance the needs and aspirations of the 'locality' with that of the surrounding 'region'. To this, the literature on new regionalism is instructive. The origins of new regionalism are found in the breakdown of public policy approaches of the 1960s and 1970s that sought to use government investments and equalization levers to account for differential economic and market impacts (Markey, Halseth and Manson, 2012). Building from a similar bottom-up approach as place-based development, new regionalism understands that development is socially embedded (Barnes and Gertler, 1999; Cooke and Morgan, 1998) and that the governance of those processes now must be open to a wider array of institutional actors, structures, and modes of participation (MacLeod, 2001b; Smyth, Reddel and Jones, 2004; Storper, 1999). In rural areas, these challenges require a scale beyond that of the locality.

By definition, new regionalism fosters a greater sense of shared responsibility between top-down and bottom-up actors (Markey, Halseth and Manson, 2008). This shared responsibility manifests at the local-regional, and the regional-national levels. As Douglas (1999, p.39), argues "a 'new' regionalism is emerging, and this reconstituted socio-political framework offers a variety of opportunities" for addressing rural community transition at a scale beyond individual localities. Experiments in new regionalist approaches have focused upon multi-level development planning and implementation (Jean, 2014; NORDREGIO, 2011; Woolvin, Atterton and Skerratt, 2012), regional investments and innovations to support transition (Makkonen and Inkinen, 2014; Shearmur and Bonnet, 2011), and research and development to help break away from past development pathways (Jakobsen et al., 2012).

The new regionalism literature also highlights a number of opportunities for the development and deployment of policy around environmental and energy transition. The first is that the region represents a manageable scale for not only understanding impacts, but also for designing mitigation policies and programs. A regional focus provides sensitivity to the local context while at the same time helping to avoid problems associated with uniform, or one-size-fits-all, policy approaches. A second is with respect to policy and program investments by recognizing the balance between needed local investment and transformative regional investments that benefit a multiplicity of places. As with place-based approaches, the collaborations and partnerships underscoring new regionalism require investments of time and effort. However, the opportunities associated with such collaboration and collective agendas include bringing additional capacity, skills, people, networks, and resources to bear on issues of concern and provides opportunities for building further capacity to respond to transition.

A key issue underscoring place-based approaches it that 'places' and 'regions' need to consider carefully their unique circumstances, capacities, and assets as they work to re-bundle elements of these into new competitive opportunities that match with local aspirations. By definition, this exploration of uniqueness

highlights that rural places and regions – no matter how they are defined within national census or land classification systems – will be different from one another. In the future, their development pathways and potentials will also be different. In terms of the energy transitions described above, some rural regions may have more, some less, opportunities to generate green energy within their territory. These are of course normal outcomes of the variable nature of geographic resources. Policy to account for distribution impacts will be an important part of supporting place-based approaches to environmental and energy transition.

One of the longstanding debates around definitions of rural places and regions concerns whether 'rural' is a geographical concept (a location with identifiable boundaries on a map) or a social representation (a community of interest, a culture, and way of life). As a result, there certainly exist a range of definitions and frameworks – including various national criteria for defining 'rural' or 'small town' through to more collective frameworks such as the OECD's 'rural communities' or 'predominantly rural regions'. Such definitions are often measures of geographic form – population size and/or population density within a given area. In some cases, economic or functional criteria may also be included.

Readers familiar with this thread of rural definition research will also know about efforts to define other 'rural' influences through inclusion of terms such as 'remote'. As such, issues of 'situation' are further incorporated into our understandings of rural community and economic development, with one of the key situational elements being proximity to, or distance from, urban centers (which could also be of different sizes). In numbers of countries, rural definitions have for some time also included attention to degrees of 'metropolitan influence'. Statistics Canada, for example, uses commuting-to-work data from the national census to estimate flows of commuters from a rural home to employment in larger urban centers. The relative 'strength' of the commuting flow is then used as a surrogate for estimating the degree of influence (strong, moderate, weak, or no influence) that the urban or metropolitan place has over rural regions. As such, the Metropolitan Influence Zone (MIZ) classifications are an important part of the description of Canadian rural places and regions. The OECD does something similar in its recognition of the differences between rural areas that are inside functional urban areas, rural areas that are adjacent to functional urban areas, and rural areas that are remote from functional urban areas.

This diversity of rural places is where place-based approaches need strong policy frameworks. Against the laissez-faire approaches of the pre-Second World War period, the Keynesian public policy framework did recognize the need for attention to services, infrastructure, and capacity building no matter the situation of individual rural places. The transition towards neoliberal public policy has meant something of a return to those earlier laissez-faire approaches with disadvantaged rural places often falling behind in environmental and energy transitions. This is where examples such as the European Union's wider cohesion policy framework are so important. Recognizing that the development assets and pathways for rural places will be different depending upon their circumstances, there is still a need for supporting and promoting community and economic development, to provide the services and infrastructure investments (across the four critical infrastructure areas detailed below) so as to reduce disparities, and to provide the top-down supports synergistically necessary to allow bottom-up community and economic development to thrive. This is a point also embedded in the OECD's rural development approach, which recognizes the need to differentiate policy responses between different types of rural regions – including differences in metropolitan influence, levels of development, historical development legacies, and dependence on hydrocarbons.

Moving forward, just as the post-Second World War paradigm required strategic investments, so too does a place-based development approach and the processes of environmental/energy transition require strategic investments. These will include in the dialogue and debate about potential energy assets, and aspirations on how to use those assets – or whether to use them at all should there be negative consequences for the environment or community. There also needs to be conversation about how economic benefits are allocated (Phillips, 2019). If a region finds itself in an energy deficit through transition, then policies around energy supply and investments if new energy infrastructure is needed. All of this suggests there is a need for attention to collaboration and to capacity assistance with environmental

and energy transition planning for rural regions. The current 'expense' mindset needs to be replaced with an 'investment' mindset towards new rural and 21st Century appropriate models of service and educational provision, communications and transportation infrastructure, and to supporting local civil society as they form the critical institutional foundation of rural places. All of these issues highlight the need to equip regions to be 'ready' for the changes and opportunities of environmental and energy transition.

Rural places and regions have now accumulated tremendous experience with processes of change, and they know that those processes of change are accelerating, these strategic investments can help them be more ready to encounter those changes and encounter them on their own terms. This engagement on their own terms transforms rural places and regions from passive receivers of external impulses or decisions (and all of the associated dependencies that go with that) into active partners. For Peltre (2019), this means building "resilient territories and citizens who know how to adapt and even anticipate the changes of a world in profound transformation". In terms of environmental and energy transition, rural regions have lagged behind cities in terms of investments into inclusive growth. This identifies both a policy area of need as well as an opportunity for economic investments through the transition. Investment areas may include carbon-neutral energy, transportation, and production technologies that can be substituted into current industrial processes, the harnessing of new energy sources from rural agricultural, biomass, and natural resource processing activities, and the construction of infrastructure to connect new rural energy generation to national grids for export or rural energy deficit areas into the same grid for consumption. Aside from the potential of technology and construction investments, the harnessing of the rural bioeconomy stands to be the most significant opportunity embodied in environmental and energy transition (FAO, 2019; German Bioenergy Council, 2018b; OECD, 2009; San Juan, Bogdanski and Dubois, 2019). At present, however, more attention is needed to adapt technologies to rural circumstances ((Mathijs, 2019).

In addition to the need for strategic investments, another lesson from the post-Second World War period is that of policy coordination and integration of community and economic development strategies. As noted above, the wicked problems encapsulated in environmental and energy transitions as part of ongoing rural change and restructuring (economic, social, cultural, demographic, etc.) demands 'whole-of-government' approaches. Sometimes we forget the massive transformations needed in government, the economy, and rural communities to manage the post-Second World War development paradigm. Mitigating the challenges and seizing the opportunities of today require no less effort.

The need a shift to a place-based rural development approach is increasingly recognized (Halseth and Ryser, 2018; Markey, Halseth and Manson, 2012). Building on this, the OECD's (n.d.) Rural 3.0 framework recognizes that rural development must focus on new forms of competiveness in concert with increased attention to 'well-being' across economic, social, and environmental metrics. It also recognizes that the former rural economic development approach of focussing on single dominant resource sectors needs to transition towards multiple sectors and place-specific opportunities. Adopting a more integrated rural development approach, the Rural 3.0 framework recognizes the concomitant need to move from government to governance – inclusive of a wider range of voices and interests if it is to realize the potential of the place-based approach.

4 RURAL FUTURES

This section looks forward at the opportunities and possibilities of environmental and energy transition. As such, it includes three subsections. The first describes the importance of a new vision that links environmental and energy transition and the shift towards more carbon-neutral economies to rural places and economies. The second subsection imagines a more idealized rural future that might arise from transition and describes some of the issues that need to be addressed to realize that future. The third section takes a more intermediate time-frame approach by providing an illustration that, while not yet actively in place, has the potential to be put in place in the near future. That illustration highlights a number of key aspects with respect to a more integrative and place-based approach to how rural places and regions can respond effectively to environmental and energy transition.

A renewed rural vision

For more than the past twenty years, community and economic development debates, policies enacted across different OECD countries, and the continuing impacts of past community and economic development legacies have all highlighted the need for a revised and renewed rural vision that can be supportive of more place-based approaches to the future. That vision has to be inclusive of seeking resilient and sustainable communities, economies, and environments. In the form of a 'wicked problem', each of these components have themselves been the subject of change (Everingham et al., 2016; Karanasios and Parker, 2018; Patterson, 2016). As we look forward through environmental and energy transition, a revised and renewed rural vision is needed to better equip rural places and regions to exercise their place-based advantages in order to meet the emergent development opportunities and challenges of this transition, on their own terms.

Building from a place-based community and economic development approach, there must be recognition that rural places have been increasingly 'on their own' with respect to the decisions of capital and the supports received from public policy. The task, as identified in the preceding section, is to re-bundle competitive assets in innovative ways. In many respects, it is about moving from a resource development strength to a diversified economic strength. Rural places and regions will not successfully navigate the coming environmental and energy transition if they are forced to do so 'on their own'; they need top-down public policy support and investment to match their bottom-up initiative. Environmental and energy transition, when matched with the diverse resources of rural regions mobilized through a place-based development approach, provides a foundation for moving from resource dependence to a diversified economy.

A revised and renewed rural vision will now need to be inclusive of at least four 'bottom lines' – community, economy, culture, and environment. This attention includes rebuilding the foundations of a strong community, complete with access to resources and services that provide a quality-of-life for people of all ages and stages of life (Markey, Halseth and Ryser, 2016). It also includes attention to an economy that is flexible, resilient, and adaptable. It also includes attention to rural development that is respectful of community and regional cultures. Beyond this, attention must also be directed to supporting, and in some cases reviving, community and regional cultures in order to address and redress the legacies of past

destructive policies or practices. Finally, the bottom line of the environment has forcefully reminded us of its place on the agenda. Climate change, and changing perceptions of the environment, are all renewing the need for attention to the environment as a critical bottom line in evaluating how we might wish to take up economic opportunities in the future. These are the foundations upon which environmental and energy transition can be harnessed in renewing rural places.

Transition strategies will need to be grounded in a realistic and in-depth analysis of local and regional assets, the infrastructure available or needed to mobilize competitive assets, and the capacities needed to take on the challenges of place-based development planning. There also needs to be attention to innovation within existing sectors, across existing sectors, and how we create the opportunities for whole new sectors. Technology adjustments and the pressures of more value-for-volume-of-commodity-extracted means that we must necessarily move up the value chain and search for new opportunities both up and down the production chain. Reduced energy inputs into existing rural economies, and increased energy capture from rural industry and the rural bioeconomy, are ways by which environmental and energy transition will infuse into a carbon-neutral rural economy. Financial support for rural regions struggling with this transition are already available – for too long rural places have been increasingly removed from the benefits derived from the natural resources extracted or harvested from their regions. In some cases, there are fiscal 'return' mechanisms but few have been long lasting and most are under the jurisdictional authority of non-rural governments (usually a national government or senior state government).

To develop new environmental and energy transition opportunities within a renewed rural vision, attention has to be directed towards assets, markets, research and development, workforce skills and training, and ongoing education so that we have an adaptive, innovative, and learning workforce, and to the base community development foundations of services and infrastructure. Linking back to the theoretical arguments, the approach embodied within general changes in techno-economic paradigms and the current environmental and energy transitions will drive required new investments across these activity areas. Tuned to the new opportunities of rural places as centers of energy, food, fibre, water, and other essentials, the techno-economic transition will support growth in both urban and rural economies as it did with the techno-economic paradigm shift that accompanied the early post-Second World War growth period (German Bioenergy Council, 2018b; OECD, 2009; San Juan, Bogdanski and Dubois, 2019).

In looking at a strategic investment framework for place-based approaches, there is a need for a pragmatic approach to infrastructure investment. This includes attention to the physical infrastructure needed for environmental and energy transition. Such would involve not only the infrastructure for the old economy (such as roads, railways, etc.), but also infrastructure for the new economy (especially new ICTs). ICTs are not only a critical part of the energy supply and control system, but they reduce many forms of energy consumption by moving information and connecting people. Unfortunately, this physical infrastructure and especially ICTs have been a bottleneck to the economic diversification opportunities that environmental and energy transition and the shift to more carbon-neutral economies may bring.

Next, strategic investments need also to be driven towards the human infrastructure available within rural regions. As an economy works through environmental and energy transition, training and attention to workforce development must focus on the new skills and capacities that are needed. More generally, there is a need to develop the capacity for the labour force to be more innovative, flexible, and adaptive. In some regions, the language is about a 'learning workforce'. If a learning workforce is truly a strategic policy goal, then it is clear that investments must begin with healthy women having healthy pregnancies, investments that are then followed into the whole stream of early childhood development and educational supports, robust and comprehensive school education, and then opportunities for specific skills training. While this is a longer-term vision around human infrastructure development than most governments and bureaucratic regimes can imagine, if implemented, it would take only a 20-year time period before we are seeing the young people emerge from their various educational streams as a learning workforce. The dynamism of environmental and energy transitions will mean that innovation and learning will be the new workplace and entrepreneurial norms.

Strategic investments to support a renewed rural vision built around environmental and energy transition are also needed within community infrastructure (Halseth, Markey and Ryser, 2019). This includes quality-of-life services and facilities, but also the community groups and voluntary organizations that are so often charged with maintaining and enhancing local quality-of-life. In too many cases, this investment has lagged while at the same time senior governments have increasingly downloaded responsibilities to communities with those responsibilities being taken up by that same voluntary or not-for-profit sector. With the ageing population found in so many OECD countries, attention to practical and respectful investments in the people and facilities that comprise a community's civil society and institutional infrastructure is required (Andrews, Cutchin and Skinner, 2018). These enhancements are needed to support the current workforce as it shifts though environmental and energy transition and it will also be needed to attract and retain the next generation workforce that will move into the resulting rural bioeconomy. The modernization of service provision incudes more attention to shared services, shared management or governance, as well as shared facilities and spaces. Such also makes use transition by reducing environmental footprints and adopting new technologies to more efficiently deliver program and services over the large distances and low population densities that define rural communities. Making more efficient use of service locations not only is more convenient for rural residents, and reduces operating costs, but it helps to conserve energy and the environment (Halseth, Markey and Ryser, 2019).

Last, investments are also needed in our economic infrastructure. In many cases, these are the best developed infrastructure investment tools in the rural regions of OECD countries – but they have often been conceptualised and funded to support 'business development' through planning, loans, advice, etc.. These existing mechanisms will also need to be re-imagined and repurposed to not only provide support to the business community as it works its way through the challenges and opportunities of environmental and energy transition, but more generally reoriented towards supporting the mutually synergetic relationship between business development and rural community development.

Idealised illustration

Environmental and energy transitions will reshape all aspects of rural communities and economies. They will occur coincident with, and work their way through, a range of other types of community and economic change. This reshaping is a result of fundamental differences between the environmental and energy paradigms of the immediate Second World War period that shaped these rural landscapes, and the environmental and energy paradigms that are today coalescing. Having spoken about the importance of a renewed rural vision, what might be said to illustrate some of the possibilities of a renewed rural place or region that has worked through environmental and energy transition.

In some future rural places and regions, …

… we will likely find that agricultural production has been re-sorted and re-organized as climate change works through. New agricultural zones will have been brought into production, and established agricultural zones have adjusted their products. Some former agricultural areas will no longer be viable, while in still others agricultural production has intensified as part of the wider economic spread of the bioeconomy and the use of its many inputs and outputs to support allied community and economic activities. The growth of continental food chains will have increased as there is some replacement of global food supply chains. Pluriactivity is now the norm across agricultural and forested landscapes as multiple land uses, users, and activities create synergies for economic development and community development – all directed with more attention to the preservation and restoration of the environment and its ecosystems.

In addition to food and fibre production, rural regions are now centers of energy production. One focus is on bio-fuels generated from agricultural and forestry activities – which are themselves now more fully integrated into the bioeconomy (Lehtonen and Okkonen, 2016). Within that bioeconomy, the circular use

of biomass to generate heat and energy has reduced the operating costs of rural industry, communities, and housing. Another energy production 'stream' of significance in rural regions is water power – including hydroelectric dams, but more often the modern and high-tech version in-stream and mill-race systems that are less disruptive of river ecosystems. Bio-energy and waterpower make many rural regions energy exporters through the electrical grid.

Technology, particularly computer-managed control technologies, helps to bind these systems of food and energy production. Technology also links rural places not only with the global economy but it also works to bring high-level and critical quality-of-life services back to the local level. No longer, for example, are rural health care patients disadvantaged as they now meet with their local doctor, in their local community, with remote specialists brought in via information technology to consult on cases. Tests and analyses move though that same information technology – all functioning because in that future rural region the ICT gap with metropolitan centers has been closed. These rural places have also revitalized older approaches to the use of energy resources as the circular economy is now thriving. In food production, for example, food stuffs are grown in rural regions, shipped in locally produced bio-fibre packaging on electrical transportation systems powered by a combination of bio and hydroelectric energy, to urban markets where the bio-wastes are used again to generate urban power, with the ash by-products, as well as the cash income generated, are returned to rural places for renewing lands, communities, and economies.

A focus on community development through environmental and energy transition means that rural places and regions have been re-imagined from former sites of extraction towards rural communities as places with inherent economic, social, and cultural strength. Rural places have lived up to their definition as communities where people can know one another, where enjoyment of the natural landscape is close at hand, where the scale of the community is such that people can contribute and can make a difference, and where children grow up without the need for over-bearing surveillance. These attributes, combined with distributive information technology, has also allowed for population renewal via the decongestion of urban centers with certain backroom office and government functions, where such decongestion supports environmental transition due to the efficiency of local movement within rural communities. Connections to new rural economic opportunities that stress niche and quality value-added products, as well as settlement for those able to exercise quality of work and life decisions assisted by internet connectivity, has furthered rural growth.

New economies, grounded in the place-based assets of rural locations, and building on environmental and energy transition are further supporting diversified economies. The economies of these future rural places are now built on a wide range of assets and values. Local production for local consumption, investments in quality-of-life services that are themselves important local economic actors, the rural bioeconomy, and exports of energy and local product to bring income into the local economy are all part of the mix. Together, rural places have become welcoming and supporting of people of all ages and stages of life. These renewed rural places are attuned to the new environmental and energy paradigm. They have invested in infrastructure and capacity building so that they remain flexible and adaptive over time to changes in economies and environments.

Immediate opportunities

While the idealized rural future maybe a few years away yet, there are opportunities now to harness environmental and energy transitions with new visions around community and economic development. This working paper shares one illustration from northern British Columbia. While not fully in place, none of the constituent parts are 'unknown' – what is required is the process coordination and political will to enact it.

A 'possible' story of place

More remote rural places can struggle under a range of limitations. While often set within magnificent landscapes, the transportation and communications links may be limited or not up to urban standards. They may not be connected to the electrical or natural gas grids such that electrical power is from diesel electric generation (with the diesel being trucked in) and home heating that comes from trucked-in propane. Jobs are limited, and the economy is often single-resource dependent.

In that place ….

The forested landscape of northern BC is harvested in order to provide wood products that are exported globally. This harvesting and exporting can provide local wealth and employment. The harvested landscape then becomes a venue for communities to engage directly in environmental restoration as they work towards the regrowth of that forest. As they work on that regrowth, different commodities come as the forest transitions. Mushrooms, edible plants, non-timber botanicals, essential oils, and a whole host of products now emerge from that harvested forest landscape as it regrows through the forest transition cycle. Also available in that forest landscape is unused fibre (fibre beyond the needs of the regenerating forest ecosystem), unused fibre that can be used for bio-energy or can be put into the rural bioeconomy.

Collecting available fibre in forest harvest areas provides new employment. Transporting that available forest fibre to communities in those remote locations also provide economic opportunities for new firms. In the community, that wood fibre can be converted into energy – heat energy using currently available technologies. Some of the energy is used to produce electricity – some of which is exported in order to generate the income needed to keep the bio-energy plant viable while the rest is consumed within the community in order to reduce the costs of living in these remote rural places. Still other electricity is used to attract bioeconomy firms interested in the ranges of products listed above.

As it works to generate electricity, the bio-energy plant also generates a great deal of heat. This heat, which had previously been exhausted, is now harnessed and captured so as to create a 'heat value chain'. While the electricity can be transported long distances via transmission lines, the heat value chain is constrained to a more local circuit. Once contained, that heat value chain is first directed into civic buildings within the community. This heat displaces fossil fuels as part of a greening of the local economy and infrastructure, but it also replaces the costs of heating with those fossil fuels. Community infrastructure is made more viable, as well as more green. The heat value chain next moves into housing across the community. Again, this displaces the expensive use of fossil fuels, eliminates the emissions from the trucks that had previously brought the diesel and propane into the community, and importantly it reduces housing costs for residents.

The heat value chain is then directed into various food production facilities. In support of local healthy living and healthy eating initiatives, small scale indoor growing systems are created to produce fresh bundles of vegetables for every household, every week. Perhaps greenhouses are also used, but they are rather more challenging to operate over indoor systems and are better suited to larger scale production. These local foods are produced using the heat and electricity generated from the bio-energy facility. They also provide an economic activity for the community and processing employment for residents as local foods are prepared for export to regional markets – or more robust products such as essential oils are produced, direct-marketed over the Internet, and then shipped through improved transportation networks so as to bring a higher value when connected to global markets.

Next, the heat value chain (now with a very low level of heat remaining) goes through other community facilities such as smoke houses and/or underneath community gardens. In both of these venues, not only are there opportunities for maintaining cultural practices, but there are also opportunities for linking across generations. Within Indigenous communities, Elders can teach youth about traditional ways of producing and preserving food. They can also share the lessons of sharing food within the community. Adults and

youth in the community can harvest natural foods from the landscape and bring them to places such as a smoke house for processing and thus contribute to the feeding of the community from within its own ecosystem. The warming of the ground under community garden can extend the growing season by a crucial number of weeks in northern and colder environments so that it can provide a place for growing traditional plants for food, medicinal, and ceremonial purposes.

At the conclusion of its use, the waste heat value chain is returned to the bio-energy plant for its next circulation.

Supporting the regeneration of the forest economy, as well as various food production activities in the community, waste ash and other organic by-products from the bio-energy plant are returned into the environment. Also captured from the bio-energy plant is the carbon dioxide output which is also circulated back to the greenhouses and other food production facilities in order to feed the plants that will soon feed the community.

This illustration highlights how we can conceptualize differently our engagements with the natural landscape; the use of the resources it offers; and how they can be driven to address local needs such as reducing costs, replacing fossil fuels, providing employment and economic opportunity, contributing to healthy eating and lifestyles, linking generations through knowledge sharing opportunities, and managing environmental restoration activities that get people on the land understanding how the community and the landscape is intimately interwoven. It also highlights the potential of environmental and energy transition in changing to how we think about rural community and economic development. Issues include local control and participation, and taking a more complex view of the environment and how it supports communities, cultures, and economies while still also supporting a host of ecosystem services. Issues also include attention to needed investments across the four key infrastructures identified earlier – but especially to improvements in the physical infrastructure available to support both the old and the new economies of places. The illustration also includes lessons about reorienting towards a more cumulative impacts and full-life-cycle thinking whenever we engage with the natural environment to support energy production or other forms of development. Cumulative impacts thinking reminds us to be aware of the scope of impacts that will need attention and warns up to be wary of sectoral or ‘silver bullet’ solutions to environmental and energy transition. Full-life-cycle thinking links us to notions such as the circular economy and reminds us to bind the rural and the urban into dialogue about the generation of products/energy/value, its use, and its recycling/re-use/return. Indeed, we can rethink the notion of development by linking back to ideas about community, society, culture, as well as economic understandings. It also reminds of the need to think about how we are designing reinvestments – reinvestments in skills, knowledge, the soils, the air, the biosphere, the community and its infrastructure, families, and individuals to name a few.

5 DISCUSSION

As we continue to move through both environmental and energy transitions, some key questions were posed at the joint OECD and European Commission workshop on “Managing environmental and energy transitions in cities and regions”. This working paper now turns its attention to these questions. Before those details, however, it is important to reiterate some key observations that have been made throughout the working paper – that transitions are already underway (Phillips, 2019), that rural places and regions have long experience with transition and change, that transition will create new opportunities and challenges (just as past transition and changes), that rural places will not successfully navigate environmental and energy transition without concrete policy and financial supports, and that transition has the potential to support more sustainable rural communities and more resilient rural economies. In addition to experience with transition on the part of rural communities and industries (detailed throughout the working paper), there are also policy frameworks available that reinforce the imperatives for transition and mark possible investment pathways to support the processes of transition. As noted, these include the Europeans Union’s ‘Energy Union Strategy’ and Circular Economy Strategy’ (European Commission, 2017, 2019), and there are also higher level policy targets and objectives such as those identified in the United Nations sustainable development goals (United Nations, 2015).

To start, what role can rural regions play in the transition to a carbon neutral economy? As it turns out, rural regions will play a key role in this transition. First, attention will be to its current suite of economic sectors and the energy transitions they will continue to work through. This pathway has already been forged by the stressors of international competition and decades of reinvestment towards competitiveness. To date, however, those competiveness investments have often resulted in fewer rural jobs and sometimes the outright closure of rural industry. Moving forward, policy and investment support for environmental and energy transition in rural regions must give primacy to renewing employment opportunities, sustaining livable communities, and supporting economic diversification. As a concrete case, Roesler (2018) reports on community-led actions that have been expanding the network of bioenergy villages in some regions of Germany. In too many cases, however, communities and rural residents are excluded from the dialogue and decision-making on energy transition (Lennon, Dunphy, and Sanvincente 2019) – something that runs counter to understandings of place-based participatory and inclusive approaches to transition (Peltre, 2019). Second, the green energy sources that are already being incorporated into existing industrial production will themselves become a more widespread activity in rural regions. This will be especially the case in those rural regions where bio-energy or water-based resources are available and can be integrated into a national energy grid. Given that urban centers will not be the sites of extensive forest or agricultural production; rural places will become ever more important centers of energy production.

A second question is about the distributional impacts of environmental and energy transition across rural regions. The answers that are starting to emerge are three-fold. First, the small scale of distributed power generation will become the norm and the management of those distributed power sources will underscore a key role for control technologies in the new energy system. This is a transformation that is already underway as numbers of national power grids already incorporate the energy generated from small-scale industrial, bio-mass, ‘run-of-river’, and similar sources. As with all aspects of environmental and energy transition, the distributional impacts will be uneven as a result of resource ownership, energy pricing,

lagging policy change, or lagging infrastructure investments (Phillips, 2019). Second, following a place-based approach, we know that different rural places will have different opportunities to participate in energy production – but this is no change from the current distributed impacts of differing geologies and climates that limit or create opportunities for rural places and regions. Third, climate change will not impact all rural regions equally and this will require place-based policy attention to deal with the differential impacts over time (Ministry of Environment and Climate Change Strategy, 2019). Using criteria such as those just listed, work can be done now to help identify which rural regions are ready for these aspects of environmental and energy transition and which regions need assistance.

The third question asks about the risks for natural resource-based industries. These industries, including forestry, agriculture, mining, and energy will be disrupted by the changing environmental and energy paradigms. But this will not be especially new to them as they have been responding for decades to policies which have tightened regulations around emissions, competitive pressures to reduce energy costs and create more valuable products with less basic resource inputs, international competition and product substitution in the marketplace, and public and consumer pressures for greener products with fewer environmental impacts. Evolutionary Economic Geography describes how incremental change can be transformative even over a short number of years and rural places and rural industries are already demonstrating this.

A final question being asked is what might be the geographic and distributional impacts of environmental and energy transformation within the global value chains of natural resource-based industries. Experience suggests that there will be changes and shifts. There will be regions and sectors that experience growth and regions and sectors that experience decline. This has been our path for many years already and it will be so for the foreseeable future. The opportunities of environmental and energy transition will become part of the pressures driving the next generation of changes and shifts. Some of the wider shifts that we need to consider include the following:

In terms of the need to think about the impacts of climate change on changing agricultural regions, and the types of food production that will be manageable in former, current, and future agricultural regions. We will also need to think about how we will counter competitive pressure in food production with emerging bio-energy production. The balance will require that we address the food and fuel needs of society without having those with limited purchasing power excluded or marginalized.

In terms of fuel, there will be some important shifts. To start, it is unlikely that all fossil fuel demands will disappear in the coming decades with the result that historically important gas production regions will remain viable for some time. Second, energy production is likely to become more continental as few electrical or bio-energy sources are as portable as oil and the transition to electrical power has the continuing very real limitations of storage as well as transmission loss. Third, as noted, environmental change will be differentially experienced. This creates opportunities in some regions while closing them in others. Again, this is an area requiring political and international trade attention, but it is also an area that currently shifting political and international trade rules are already foreshadowing. Finally, the nature of place-based community and economic development attention needs to be directed to re-imagining and re-bundling assets to create competitive advantage. This is not only required to create more activity, but also to leave more of the wealth within the providing places and regions. Place-based community and economic development needs to shift our thinking towards quality-of-life and quality of economy rather than simply volumes of raw materials produced.

6 CLOSING

As policy-makers move to adopt a more proactive stance regarding the transition to a sustainable techno-economic paradigm regarding resource use and energy, the most important variable will be the authentic engagement of, and support for, rural communities and regions. The transition will evolve over the long-term and must be guided by a coherent vision and active policy and investment supports at each stage. This report outlines how transitions have taken place and affected rural communities and regions, including the treatment of and prospects for Indigenous peoples in those 12 OECD countries with large Indigenous populations. Understanding these legacies is critically important for rural policy and decision-makers at all levels. The past will shape, limit, and present opportunities for the coming environmental and energy transition. This is a significant challenge for policy-makers, most of whom now live and work in urban cores - with this challenge exacerbated by the loss of broader institutional knowledge of rural places given the loss of government 'boots on the ground' in rural regions due to decades of retrenchment and closure.

As policy-makers approach rural communities, they should expect considerable skepticism. This skepticism is the result of past changes, where rural communities and regions were largely left 'on their own' to deal with structural changes in their economies. Even further, as rural communities and resource sectors have undergone restructuring, senior governments removed core capacity from rural regions and failed to transfer any meaningful jurisdiction, further hindering the ability of rural communities to adjust to new economic realities. In those OECD countries that have not adopted place-based policy tools, national actions 'enabling' rural communities to address their community and economic development 'from the bottom-up' fall short when those rural communities lack the tools and resources to take up place-based opportunities. In such cases, there is a poor legacy of ineffective, piecemeal, sector limited, and short-term rural development policy. For Indigenous communities, resistance and skepticism to senior government intervention is born from a long history of colonial oppression and duplicity.

Rural skepticism and resistance to change will also depend on the authenticity of the engagement and the actions of senior governments at a broader level. If specific rural regions are being asked to bear the brunt of the energy transition while governments continue to subsidize, facilitate, and expand the fossil fuel sector in other regions, rural places will resist change and mobilize politically toward actors tied to the maintenance and growth of the existing energy paradigm.

Where the report documents positive directions to facilitate a just transition to a new techno-economic paradigm we see three important variables. First, the transition to a new energy platform is a highly integrated and complex process. Coordinated public policy responses are critical. The involvement of different sectors of rural society is critical. In addition, adopting an investment mindset across the spectrum of rural development is critical. This is not a sector-based issue. Second, within the 12 OECD countries with large Indigenous populations, Indigenous empowerment, supported by legal victories concerning rights and title, offers considerable hope concerning the scaling-up and out of transition strategies. Given title considerations, the benefits of transition associated with Indigenous development will also serve to anchor resources and benefits in rural regions. Ongoing learnings concerning how to structure respectful dialogue and development agreements between neighbouring Indigenous and non-Indigenous communities will also present considerable opportunities for transition. Third, the energy transition offers the opportunity to rethink and re-regulate the distribution of benefit from resource development. This

includes diverting a larger share of resource wealth back to resource producing regions in order to help facilitate development and infrastructure renewal for the new rural economy. It must also include just transition strategies to directly aid workers and communities most impacted by the move away from intense fossil fuel production.

The environmental and energy transition is already underway, albeit in sometimes highly contradictory and uneven ways from a rural perspective. A final note of optimism must identify and recognize that we already know enough to support meaningful and proactive policy to support a just transition, for rural communities, workers, and the environment. What also exists is a strong network of rural development researchers, scholars, practitioners – and policy-makers – with access to this knowledge that we may continue to share and mobilize.

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