A case for a systems-level approach to pragmatic transition planning

Rakhi Kumar, Senior Vice President, Sustainability Solutions & Business Integration, and Chair of Liberty Mutual's Climate Council
Victoria Yanco, Sustainability Consultant

Overview

At Liberty Mutual, we see the climate crisis as one of the pressing challenges of our time and believe it is beneficial for organizations to pursue climate transition planning that can ultimately help them conceptualize the transition and make real, sustainable changes as society moves toward a low-carbon future.

We acknowledge that the common approach to transition planning narrowly focuses on transitioning current operations and/or portfolios. In such cases, there is a risk that the transition plans may fail as they do not adequately consider factors that are out of a company's control, but that could have a significant impact on the ability to meet the planned goals.

Many firms rely on forward-looking scenarios to understand net-zero pathways and develop transition plans. Most climate scenario pathways are generated by integrated assessment models (IAMs) — tools originally designed for global policy decision-making. These models are used to evaluate the technological and economic feasibility of climate goals such as the Paris Agreement's long-term temperature goal to hold global warming well below 2˚C and pursue efforts to limit such warming to 1.5˚C above preindustrial levels.[1] However, such models have yet to be suitably adapted to support transition planning at the financial portfolio level and should be used with caution for this purpose.

In this paper, we establish the importance of a systems-level approach to transition planning that takes a macro perspective by considering economic, technological, scientific and political realities. In particular, we call for the examination of three macro inputs as a starting point for any transition planning process:

- The global climate policy landscape
- Energy demand in a net-zero world
- Energy supply in a net-zero world

A Case for a Systems-Level Approach

A growing number of companies have announced their ambition to achieve net-zero carbon emissions by 2050, and many have used the *Recommendations of the Task Force on Climate-Related Financial Disclosures*, published in June 2017, to guide "short-, medium- and long-term actions, achievements, and strategic ambition, as well as the financing required at each milestone."[2] However, making progress on their pledged net-zero commitments has become a challenge due to the three key risk factors:

- **Economic:** Fossil fuel extraction and usage in the near term remains a market reality and a critical societal need.
- **Technological:** Innovation timelines for the deployment of renewable technology are uncertain.
- **Political:** Climate transition policies and commitments vary by region and don't always support net-zero goals.

These macro impediments, make it difficult for companies to independently make progress on their net-zero commitments. Moreover, companies' failure to meet their transition plan objectives often draws criticism from stakeholders and, in some cases, can result in reputation risk or litigation.[3]

A systems-level approach to transition planning offers a pragmatic alternative to popular transition planning methods by identifying the external factors that are beyond a company's control and pacing transition milestones with economic, technological and policy momentum.

To synthesize systems-level transition planning inputs, we rely on the Network for Greening the Financial System's (NGFS) integrated assessment models, with a focus on the NGFS's **Divergent Net Zero (DNZ)** scenario — a scenario that delivers net-zero outcomes by assuming a disorderly policy transition environment.

We juxtapose the DNZ pathway, or "where we need to go" to achieve net zero, with the **Nationally Determined Contributions (NDC)** scenario, or the "where we are headed" scenario, that illustrates transition pathways based on country-specific commitments and policy actions.

A pragmatic transition planning process calls on companies to explore the differences between these two scenarios and consider the companies' ability to influence or control real, meaningful decarbonization through individual company action. With this in mind, we highlight three transition planning imperatives for companies:

1. Understand the climate policy landscape.
2. Evaluate changes to energy demand.
3. Analyze the projected sources of energy supply that will help power a net-zero world.

Understanding the global climate policy landscape

Any credible net-zero transition is highly dependent on national governments across the globe working together in a coordinated, not necessarily common, manner to reduce energy sector emissions. In our recent paper "Transitioning to a Low Carbon Economy: Public Policy Realities That Challenge Companies in Building Achievable Transition Pathways," we found that a common global policy is unlikely for a variety of reasons. Most notably, many regions have committed to net zero on different time scales. For example, whereas the European Union and the United Kingdom have committed to achieving net-zero emissions by 2050, China and India have committed to the same goal by 2060 and 2070, respectively.

The actions of an individual company cannot substitute for global policy coordination, without which actions in one region may be ineffective in transitioning global production and extraction away from fossil fuels toward less-carbon-emitting energy sources. For example, a technology that may be considered "green" — defined as supporting the transition — in the United States may not be under the EU taxonomy for sustainable activities.[4] Consequently, an EU-based company may lack the incentive to support or adopt the same technology that another jurisdiction considers critical for achieving its transition goals. The lack of coordinated climate policy action or geopolitical rivalries between governments can also challenge companies as they can disrupt existing supply chains and manufacturing capabilities, which in turn exacerbates the global transition risk that needs to be mitigated.

Therefore, we suggest that **as a first step to managing transition risk, companies must stay current on global climate policies.** That includes understanding the types of policy actions different governments are taking or will take; the implications of those policy actions on local economies and global trade; and those actions' implementation timeframes, which may vary across economies. Companies should couple that information with a thorough understanding of their current business footprint and planned growth targets based on geography and sector to fully understand how the transition may present risks and opportunities unique to them.

Evaluating energy demand in a net zero world

The next step in transition planning is understanding the energy demand assumptions embedded in the scenario pathways — this is critical to understanding how much energy is needed to power the economy. We recommend analyzing energy demand — known as primary energy consumption — in the NGFS scenarios, which use historical energy statistics to forecast how energy indicators might change in response to different policies, technologies and climate ambitions.

What is primary energy consumption?

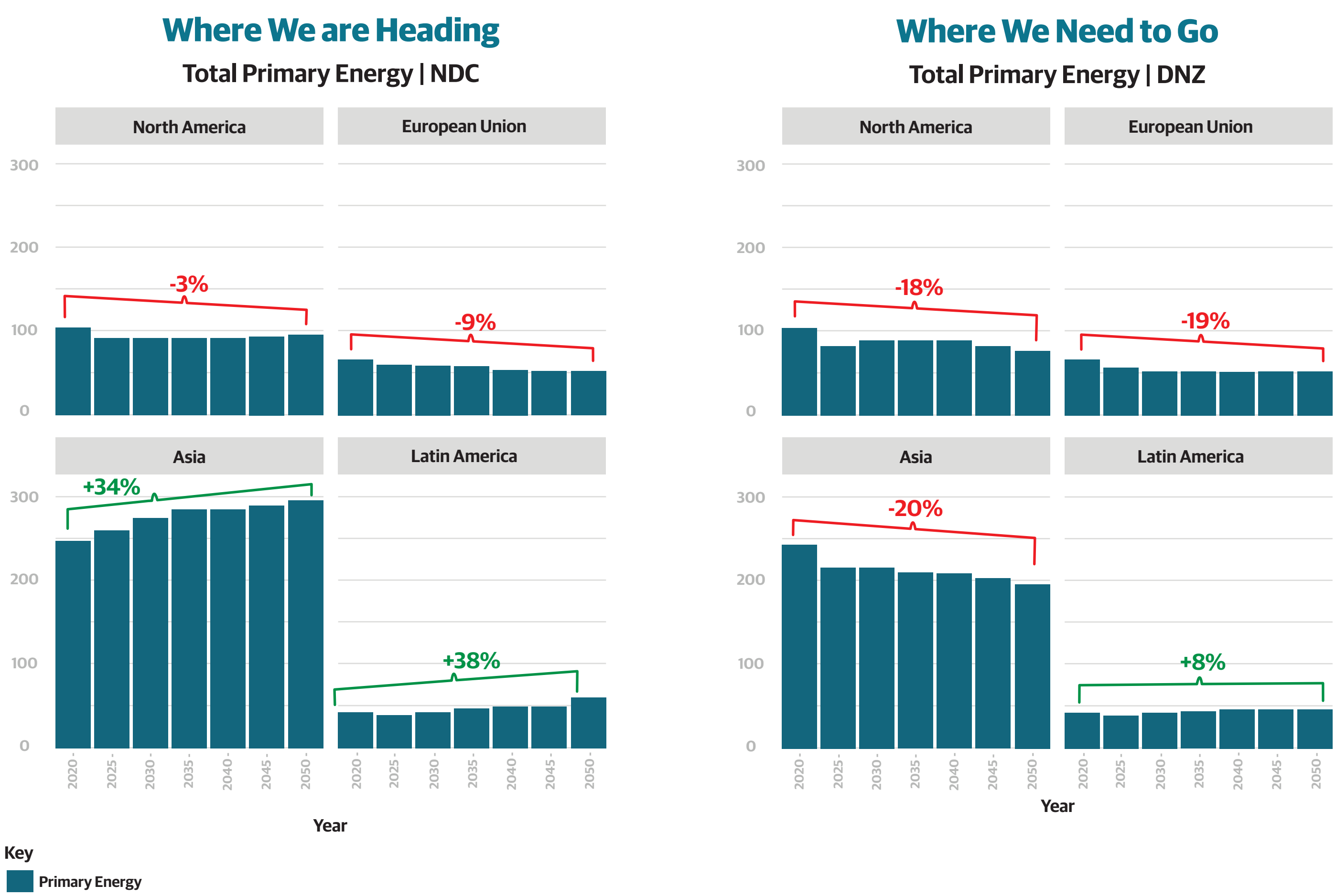
- Primary energy consumption is typically defined as the total amount of energy that a region or country has available for use.
- The measurement of primary energy includes domestic energy production plus imported energy, minus exported energy and the depletion of reserved energy. The measurement of primary energy is defined by the following equation:

  Primary energy = (domestic energy production + imported energy) – (exported energy + use of reserved energy)

By comparing total energy demand across regions, we can better understand the different ambitions, actions and timelines that actors may adopt to achieve global decarbonization. The analysis allows companies and governments in these regions to conceptualize the magnitude of change needed to achieve the transition as well as the time horizon necessary to achieve net-zero goals by 2050.

Below in exhibit 1 we have used NGFS scenarios to capture the total primary energy values for the four macro-regions of North America, the European Union, Asia, and Latin America and how they might change by 2070.

Exhibit 1. Total primary energy consumption by region — Nationally Determined Contributions and Divergent Net Zero scenarios



Source: Total primary energy demand per region, NGFS v3.4 GCAM.

Key Insights

1. **The policy gap:** When comparing different scenarios, we find a significant mismatch between projected demand under the NDC and DNZ scenarios. For example, to achieve net-zero objectives, the demand for energy needs to fall by 20% in Asia from 2020 to 2050, but based on current government policy commitments, it is expected to increase by 34% over the same period. That is a difference of more than 50% in projected energy demand in the region.

2. **Regional variations**: We see that in the DNZ scenario, some regions decrease while other regions increase their primary energy consumption — indicating that regions have differing pathways in achieving global net-zero goals. This is further evidence that the world needs to prioritize coordination and not common action when it comes to the energy transition.

3. **Efficiency first:** Although the NGFS modeling suite portrays a drop in energy demand between 2020 and 2025 for all regions, the future-looking slope for that decline is neither sharp nor persistent. This trend coupled with the reality of a growing global population and gross domestic product means that the efficient use of energy needs to improve markedly to achieve climate goals.

What do these key findings mean for the energy transition? The data reveals that **global energy production and demand constitutes a major hurdle to overcome as we seek to deploy low-carbon energy system solutions at scale.** The world will need to minimize almost all inefficiencies in the generation and transportation of energy, including updating transmission and storage channels and investing as much in efficiency improvements of existing technology as we do in supporting new energy technologies. In regions where economies and populations are forecasted to grow rapidly, such as Asia, where the amount of total energy demanded is already the highest across the macro-regions compared, solving the efficiency question is particularly important as we seek to achieve difficult climate targets.

Projecting the energy supply

Next, by looking at the energy supply — referred to as the primary energy mix by NGFS — companies can gain important insights into current and future energy system trends and dependencies by technology.

What is the primary energy mix?

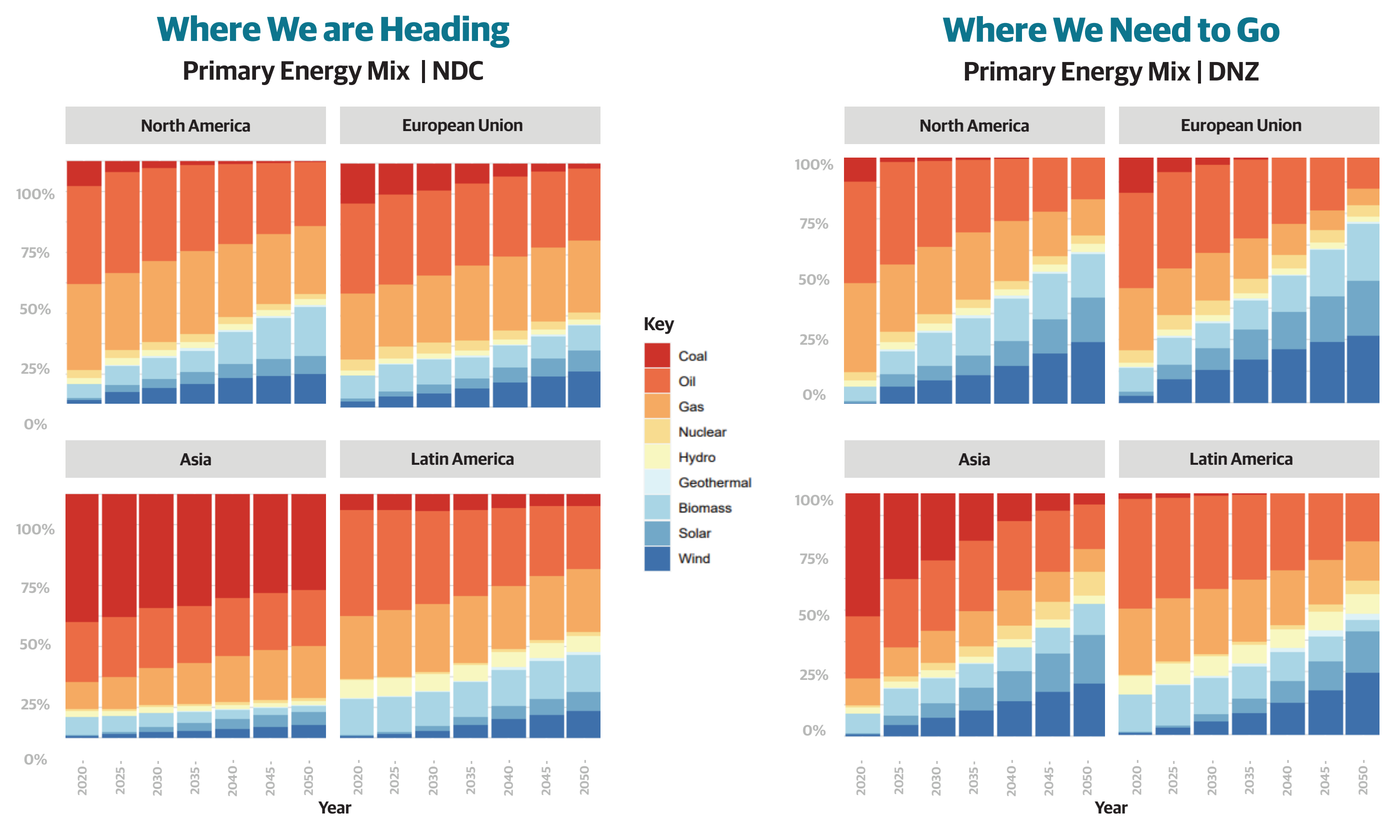
The term *primary energy mix* refers to the types of fuel sources used to meet energy needs. The energy mix of a region typically includes fossil fuels and low-carbon or renewable energy sources.

The primary energy mix is made up of fuel sources that have not undergone human-engineered conversion processes. For example, crude oil and solar are considered primary energy sources as those fuel sources enter the energy system with zero or minimal conversion. Electricity and hydrogen fuel are considered secondary energy sources as those energy sources have been transformed through energy conversion processes.

In this paper, we focus on the primary energy mix.

Exhibit 2 illustrates the energy supply of the four macro-regions against a spectrum of energy types, from fossil fuels to renewable energy technologies. The analysis illustrates the scale at which different energy types will continue to be demanded through 2050, providing insight into how to pursue a low-carbon economy. It also provides a comparison of the difference between the projected energy supply needed to meet net zero based on the DNZ scenario and the trajectory of the expected energy supply embedded in current policy and government commitments as shown in the NDC scenario.

Exhibit 2. Energy supply by region needed to meet global net-zero goals – Nationally Determined Contributions and Divergent Net Zero scenarios



Source: Total primary energy demand per region, NGFS v3.4 GCAM.

Key Insights

1. **The Policy gap:** There is a significant mismatch between projected energy supply under the NDC and the DNZ scenarios. For example, to meet net-zero objectives, primary energy generated by renewables in Europe is projected to reach an order of magnitude of 70% by 2050. However, based on current government policy commitments, renewables are projected to account for less than 50% over the same period. **A pragmatic transition planning process calls on companies to consider and explore the business implications of this mismatch when setting their reduction goals.**
2. **No single energy source will dominate:** While the scenarios represent probable futures that are subject to model volatility, it is likely that no single energy source will dominate the energy mix in the future. Therefore, the global economy will need companies to support a mix of energy types to ensure near- and long-term energy security and a just transition.
3. **Fossil fuels never fully go away**: Fossil fuels may not be eliminated from the energy supply in any region but will be reduced as the mix changes over time. According to the scenarios, the continued use of fossil fuels in a net-zero world, however, will depend on technological efficiency gains and the use of currently untested carbon capture and storage technologies (CCUS / CCS). Given the regional differences in the current energy mix, climate policy will vary across geographies.

Below in Exhibit 3 the insights represent possible changes in the world's energy system under a DNZ scenario pathway.[5]

Exhibit 3. Energy Sources under the Divergent Net Zero scenario

Fossil Fuels	Renewable Technologies
• Coal usage in all regions must fall significantly by 2050. • The decline in coal usage would be the most extreme in Asia, as coal currently accounts for more than 50% of the region's energy supply. • While fossil fuels other than coal, such as oil and natural gas, also are projected to decline as a proportion of regional energy mixes under this scenario, they would still be a meaningful source of energy in a net-zero world. [6]	• Solar, wind and possibly biomass are the major candidates for renewable technologies to replace fossil fuels. • The energy mix across regions is set to become more varied as the century progresses and more emphasis is placed on renewable sources. • For renewables to reach the scale necessary to achieve net zero by 2050, significant investment in energy storage as well as in grid efficiencies and resiliency needs to occur.

Conclusion

We must acknowledge that **climate transition planning is a complex and iterative process.** Building a comprehensive business strategy starts with assessing multiple angles — as does a systems-level approach to transition planning. Companies that evaluate transition risks against scientific insights can create plans that have a better chance of real-world success. Maintaining a broad view that encompasses global climate policy and gaining an understanding of energy consumption and demand trends as described in this paper are fundamental steps in this process.

We have seen in the past year that transition plans that do not consider such externalities are destined to fail — for example, a number of global insurers have abandoned the United Nations' Net-Zero Insurance Alliance.[7] This is why it is imperative that we embrace systems-level thinking now. As demonstrated in this paper, a transition planning exercise that is at odds with how the real economy operates could increase transition risk.

We must also acknowledge that the **transition tools the business community currently has at its disposal are inadequate for decision-making, particularly for the mid- to long-term time horizons**. At best, companies can leverage these models to inform short-term transition planning that can in turn inform their business strategy. Any reporting requirements that would oblige companies to publish detailed transition plans should consider this reality. The NGFS supports this view, cautioning that "while significant research advances have been made [in modeling] recently, care should be taken in using the results [in isolation], particularly at the most granular levels."[8]

Taking a systems-level approach that combines modeling's scientific conclusions with other macro factors is the way forward as it forces us to challenge our assumptions, which in turn can catalyze creative solutions to drive pragmatic climate transition planning.

Leveraging the NGFS Research

We have leveraged insights from Liberty Mutual's climate scenario transition research based on research available from the Network for Greening the Financial System (NGFS).[9] Liberty Mutual found that the NGFS climate scenarios provide clear and customizable insights into different low-carbon-future scenarios. NGFS has used a collection of economic, climate, energy and agricultural data to design a set of transition scenarios in partnership with climate experts and economists. The climate scenarios provide reference points for understanding climate change in conjunction with consideration of upcoming policy and technology trends — as well as the various ways these trends could evolve. These scenarios outline a range of physical and transition risk outcomes, which can help one diagnose the climate challenges that inform business strategy and develop solutions to mitigate risks and take advantage of growth opportunities.

On a cautionary note, all modeling insights or predicted trends derived from macro datasets such as that of NGFS or micro-impacts from portfolio-specific tools need to be critically reviewed and evaluated against the current social, political, economic and technological backdrop. It is important to remember that the integrated assessment models must make a few key assumptions and simplifications to generate usable data. For example, the models assume scalability and adoption of technologies that are still emerging or the timely adoption of pragmatic climate and economic policy that supports the transition to a net-zero future.

Send questions or comments to
sustainability@libertymutual.com

[1] Climate Analytics, "Integrated Assessment Models: What Are They and How Do They Arrive at Their Conclusions?"

[2] The UK Transition Plan Taskforce Disclosure Draft

[3] See M. Golnaraghi, J. Setzer, N. Brook, W. Lawrence, & L. Williams, "Climate Change Litigation: Insights into the Evolving Global Landscape," Geneva Association Research Brief, 2021.

[4] The EU taxonomy is a classification system that defines a list of environmentally sustainable economic activities. See "EU Taxonomy for Sustainable Activities," European Commission.

[5] Please note, the insights are not absolute and merely represent the plausible scale of change needed to achieve net zero. All insights are subject to change due to modeling changes and scenario assumption variation in future NGFS iterations.

[6] This is contingent, of course, on efficiency gains and progress with currently unscaled technologies, such as currently untested carbon capture and storage technologies.

[7] J. McGowan, "Insurers Leave U.N. Climate Alliance Over ESG Pushback and Antitrust Claims," Forbes, May 26, 2023.

[8] Network for Greening the Financial System, Scenarios Portal.

[9] Network for Greening the Financial System, Scenarios Portal.

August 2023. This research is published part of the Liberty Mutual Climate Transition Center.