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Policies are being put into place before key questions are asked. These policies run the gamut stemming from U.S. state legislative, regulatory and local actions, corporate actions and global regulatory decisions, particularly related to financial markets.¹ An October 2019 Citi Global Perspectives and Solutions Report identified two financial risks of climate change: 1) the risk of stranded assets, and 2) the cost of doing nothing. These two risks have been identified by many others over the last several years.

A third risk has yet to garner attention although it is rapidly surfacing as climate policies emerge around the world and in the United States. It is the risk of no innovation.

Before we dive in, let's start with what we know. First, addressing climate change is a complex, global challenge that we all share. Second, we know that companies are investing billions in research and development, new technologies and

¹Many of the policies center on the concept of addressing systemic financial risk from climate change even though policies that limit diversity concentrate risk. The concentration of risk was discussed at length by many experts throughout the 2010 Dodd-Frank Wall Street Reform and Consumer Protection Act debates and in the years since.

new assets. Third, we know that these investment decisions are based on an evaluation of many factors and viable alternatives.

Taking energy as an example, investment considerations include load requirements, geographical proximity, fuel availability, production characteristics, capital and O&M costs, greenhouse gas emissions, the asset's useful life, access to other resources like water, and the stage of the technology just to name a few.

The point is this – investment decisions are based on many factors that are unique to the investor and investment. Importantly, the factors are also unique to the point in time when the decision is faced *even though* the investment decision has an impact on the market for many years to follow. Energy investment decisions made today will impact subsequent energy investment decisions and energy markets for decades. Like a pebble thrown into a pond, there is a ripple effect.

Since the Paris Agreement, cities and states representing more than half of the U.S. economy have declared support. According to Bloomberg Philanthropies, if these cities and states formed a single country, its economy would be the third largest in the world. Bloomberg Philanthropies also notes that more than 1,000 businesses operating in the United States and representing \$25 trillion in market capitalization have voluntarily adopted greenhouse gas emission reduction targets. According to the Center for Strategic and International Studies, 51 carbon pricing initiatives exist today

covering 20 percent of global greenhouse gas emissions. Further, more than half² of U.S. states have adopted renewable portfolio standards or fuel source goals for their energy utilities. In some instances, the fuel source goals are economy-wide, extending beyond the energy utilities.

The Paris Agreement is intended to adjust the flow of capital. Responding to the Paris Agreement, the Financial Stability Board created the Taskforce for Climate-Related Financial Disclosures to develop voluntary, consistent financial risk disclosures for use by companies to provide climate related risk information to lenders, insurers, investors and other stakeholders. Since that time, several banks announced changes to their lending portfolios,³ development banks adopted frameworks⁴ to screen assets for investment, and corporate credit rating agencies⁵ announced plans for how climate-related risks will be assessed.

These actions, especially when viewed alongside the growing trends of state laws and regulations share a common theme – a narrow focus on carbon emissions with a prescription for those investments that are to be deemed suitable.⁶ In some

²Twenty-nine states and the District of Columbia have adopted a renewable portfolio standard (RPS). The timelines, targets, impacted sectors and the definition of “renewable” differ.

³As an example see the October 11, 2017 press release from BNP Paribas available at <https://www.bnpparibas.com.cn/en/2017/10/11/bnp-paribas-takes-further-measures-to-accelerate-its-support-of-the-energy-transition/>.

⁴As an example see the December 12, 2017 World Bank Group announcement at One Planet Summit available at <https://www.worldbank.org/en/news/press-release/2017/12/12/world-bank-group-announcements-at-one-planet-summit>.

⁵As an example see the Moody’s Investors Service June 28, 2016 Sector In-Depth Environmental Risks Report available at https://www.eenews.net/assets/2016/06/29/document_cw_01.pdf.

⁶See as an example of a recent state public utility commission action -- <http://ieefa.org/indiana-regulators-reject-gas-plant-tell-utility-to-reconsider-renewables/>.

instances, the investment prescriptions are intended to *drive* a policy agenda.⁷ While investment decisions are appropriately motivated by many perspectives, the risk lies here.⁸

Even with a variety of environmental goals, different approaches and time horizons, the targets tend to focus on the year 2050.⁹ Although perspectives differ on whether the year 2050 seems distant or near, let's put 30 years into perspective by looking back at natural gas markets.

Within the last 30 years, wellhead decontrol was adopted paving the way for market forces to establish the price of natural gas. The natural gas market has weathered two natural gas-fired power generation development booms, and an industrial sector recession, recovery and growth. The size of the physical natural gas market has nearly doubled, and the U.S. has emerged as the world leader in the production of natural gas. In short, in a timespan of less than 30 years, the most

⁷The Energy Modeling Forum 27 work at Stanford University suggests that predicting absolute world energy demands by type carries uncertainty as the scenarios are heavily influenced by technology and policy assumptions. This reflects unpredictability in the pace and breadth of changes in the global energy landscape.

⁸There are 17 United Nations Sustainable Development Goals: No poverty, zero hunger, good health and well-being, quality education, gender equality, clean water and sanitation, affordable and clean energy, decent work and economic growth, industry, innovation and infrastructure, reduced inequalities, sustainable cities and communities, responsible consumption and production, climate action, life below water, life on land, peace, justice and strong institutions, and partnerships for the goals.

⁹The 2050 or "mid-century" reference stems from the 2014 United Nations Intergovernmental Panel on Climate Change (IPCC) report. The climate science consensus pointed to this timeframe where significant emission reductions were needed to limit global warming to 2 degrees Celsius above pre-industrial levels. These mid-century and end of century dates were then carried into the framework of the Paris Agreement.

transparent and liquid physical commodity market¹⁰ on the planet sprang to life – a market that delivers \$85-\$100 billion¹¹ in physical commodity market value to millions of consumers in the U.S. and abroad annually. Market-driven capital allocation achieved these results.

If the 1966 natural gas resource estimate had remained static, the United States would have run out of natural gas in 2005. Innovation made the thinking of 30 years ago obsolete.¹²

Today, natural gas production is geographically diversified and abundant, with natural gas consumers having access to vast amounts of pricing and fundamentals data on which to base an investment decision. Natural gas paved the way for electric power sector CO2 emissions reductions below 1990s levels and more than \$100 billion in industrial sector U.S. investments just in the last decade.

Just as diversity mitigates risk in a stock portfolio and builds resilient companies, a diversity of paths is key to attaining our world’s environmental objectives. Policies surrounding capital investments are falling victim to “conforming bias.” Investment decisions once based on a variety of competing market factors are instead increasingly

¹⁰October 2006 on Natural Gas Price Transparency and Liquidity by Dr. Peter Locke for the Natural Gas Supply Association available at https://www.ngsa.org/download/analysis_studies/Locke-Transparency-Paper.pdf.

¹¹Simply estimated as follows based on Department of Energy - Energy Information Administration data: 32.7 Tcf in 2018 Marketed Natural Gas Production multiplied by \$2.67/Mcf Average 2019 Henry Hub Price equals \$87.4 Billion or 32.7 Tcf multiplied by \$3.27/Mcf Average 2018 Henry Hub Price equals \$107 Billion.

¹²Recent innovations impacting everyday life abound. We need to look no further than the ability to “Google” the correct spelling of a word to understand why dictionaries are in the bargain bins of thrift shops.

limited to a prescribed list of acceptable technologies, a narrow time window and the single perceived environmental externality of carbon emissions.

As IHS described in an April 2017 report, capital market distortions translate to energy market distortions. As policies increasingly direct capital investment based on a narrow set of criteria that is informed by *today's* technologies, the underlying market ceases to respond to the ever-changing and evolving push-and-pull of competition and diversity of thought, objectives and alternatives.

We only need to look at the last 30 years to understand the dramatic change that innovation – born of competing and diverse ideas – can create. Yet today, purse-strings are held in the hands of prescriptive capital investment policies that are replacing at breakneck speed the existing rigorous and multifaceted diverse capital investment decisions. It's the investment equivalent of putting all the eggs into a single basket.

Rules that stipulate and limit investment also limit the market's ability to innovate. If physical energy market investments are driven by a pre-determined narrow set of guidelines instead of competing ideas, how do we make sense of the underlying market response and how do we assure sound markets for consumers? Perhaps even more importantly, if investments are prescribed or channeled to a narrow set of ideas, how does the market create game-changing innovation? Do policies that channel investments *protect* consumers from market and systemic risk?

The CFTC has a role to play. Systemic financial risk is mitigated when commodity markets are diverse and regulatory frameworks ensure that all eggs are not

in a single basket.¹³ Yes, there is a stranded asset risk and the cost of doing nothing. But there is another risk. The third financial risk of climate change is the missed innovation stemming from capital policies that over-ride the market and narrowly conform investment.

Thank you Chairman Tarbert and Commissioners Behnam, Stump and Berkovitz for asking the question. If energy investments are driven by a predetermined view of what is acceptable or not and physical market investments are channeled by regulatory forces, as if an umpire is calling balls and strikes, both physical and financial market distortions are inevitable. Sound financial commodity markets stem from sound underlying physical markets.

¹³See https://www.ngsa.org/download/filings_testimony/congress_comms/NGSA-CLNG-Letter-Strategic-Energy-For-America-Act.pdf. The Senate Energy and Natural Resources Committee Discussion Draft – Strategic Energy for America Act of 2019 recognizes the importance of fuel and technology neutrality in development bank financing decisions and the leadership role that the United States Treasury must play in ensuring sound long-term energy investment decisions.