Testimony before the
Senate Committee on Energy and Natural Resources
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February 5, 2019

Good morning and thank you for this opportunity, Madam Chair and Ranking Member Manchin.

I am here today in my role as analyst at BloombergNEF, a division of financial information provider Bloomberg L.P. Our group provides investors, utilities, oil majors, policy-makers, and others with data and insights on the energy world and other sectors of the global economy undergoing rapid transformation. My remarks today represent my views alone, not the corporate positions of Bloomberg L.P. And of course, they do not represent specific investment advice.

Progress in the energy industry used to be measured in decades. Its scale meant that the adoption of any new technology or fuel was, by definition, slow and laborious.

Today, however, how the world generates, delivers, and consumes energy are all evolving rapidly – and radically.

These changes have allowed new industries to flourish. The wind and solar power sectors now employ over 450,000 Americans while over 2.2 million Americans perform work related to energy efficiency.

Meanwhile, major capital flows are supporting these industries. Our firm counted $332 billion invested worldwide in new energy technologies last year and over $3 trillion in the last decade.

We believe more change – much more change – inevitably lies ahead. In fact,

the riskiest bet investors, utilities, carmakers, oil companies, and policy-makers can make is to assume that the energy world we have today is the one we will have tomorrow.

To take one example, consider how personal transportation is changing and the implications for motor fuels demand. In 2013, pure electric vehicles (EVs; not hybrid cars) represented well under 1% of total vehicle sales in the U.S. By the 4th quarter 2018, they topped 4%. China, the world's largest car market, added 1.1 million EVs in 2018.

In all, there are nearly 5 million EVs on roads worldwide today. By 2030, we project one in 11 cars will be electric. By 2040, one in three.

Growth will be propelled by declines in the costs for lithium-ion batteries, the most expensive components in any EV. Typical battery pack prices have already dropped 85% since 2010. As China, South Korea, and others ramp production, economies of scale will depress prices further.

By the mid-2020s, consumers will choose EVs purely based on price – not subsidy – and this important cross-over could occur sooner if oil prices rise.

We at BNEF are hardly alone in our outlook. The major oil producers have repeatedly raised their own projections for EV sales in recent years. More importantly, Total, BP, Shell, and Chevron have all invested in or outright acquired electric vehicle charging companies or power utilities.

One potential reason: electric transportation will by 2040 subtract 7.5 million barrels/day of demand for crude products.

More change is also inevitable in the power sector, driven by cost declines and a

move toward “decentralized energy”.

Prices for photovoltaic modules – the solar panels you might put on the roof of your home or business – have fallen from approximately $4.50/Watt in 2008 to about $0.25 as of year-end 2018. For millions of U.S. businesses and homeowners, the decision to “go solar” is being driven by the chance to cut monthly electric bills or lock in fixed rates for power. I’d also note that PV panels function perfectly well in cold weather.

By the end of the next decade, solar will be cost competitive in most parts of the U.S. – without the benefit of subsidies. PV generation will grow from about 3% today to approximately one-quarter by 2050.

The wind industry can tell a similar story as its generation costs have sunk by more than half since 2009 thanks to larger, more efficient turbines. Last year, wind accounted for about 6.5% of U.S. power. While new wind farm completions will likely slow once the current Production Tax Credit phases out, wind’s share of generation should still rise to 14% by 2030, particularly if offshore projects planned off the eastern seaboard come to fruition.

Greater penetration for these technologies must be accompanied by greater deployment of "flexible resources" such as pumped hydro projects, demand response programs, and batteries of various shapes and sizes.

Utility companies, along with a slew of energy-storage start-ups, are starting to respond. AES, AEP, Southern California Edison, and Southern Company among others are deploying large-scale batteries on the grid, or at smaller scale “behind the meter” in homes and businesses.

I'll close with a point about energy consumption and its role in climate change. Because no responsible conversation about energy policy can take place without thinking about CO2 emissions.

Last year, U.S. emissions bucked what has been an 11-year trend generally downward. Instead, they rose 2.5% economy-wide from the prior year, based on our preliminary analysis of EIA data.

The economy grew much faster in 2018 and that probably played a role. But the year also saw more extremely hot and cold days, which appears to have prompted greater use of heating and air-conditioning. That, in turn, boosted CO2 emissions.

This raises the possibility that as we live with the effects of climate change today, it is becoming more challenging to cut emissions and address climate change tomorrow.

As you can tell, I am fundamentally optimistic about the transformative potential of new energy technologies. But I am under no illusions.

The dramatic changes we anticipate over the next three decades will not sufficiently cut CO2 emissions in the U.S. or worldwide to curtail the worst impacts of climate change as detailed by the world's scientific community.

In other words, technology and economics alone cannot save us. New and better policies are needed to accelerate the transition.

But that that is where policy-makers, not energy analysts, must have their say. So with that, I will stop and say thank you again for this invitation.

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