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INFLATION & THE ENERGY TRANSITION

COMMENTARY | SEPTEMBER 2021

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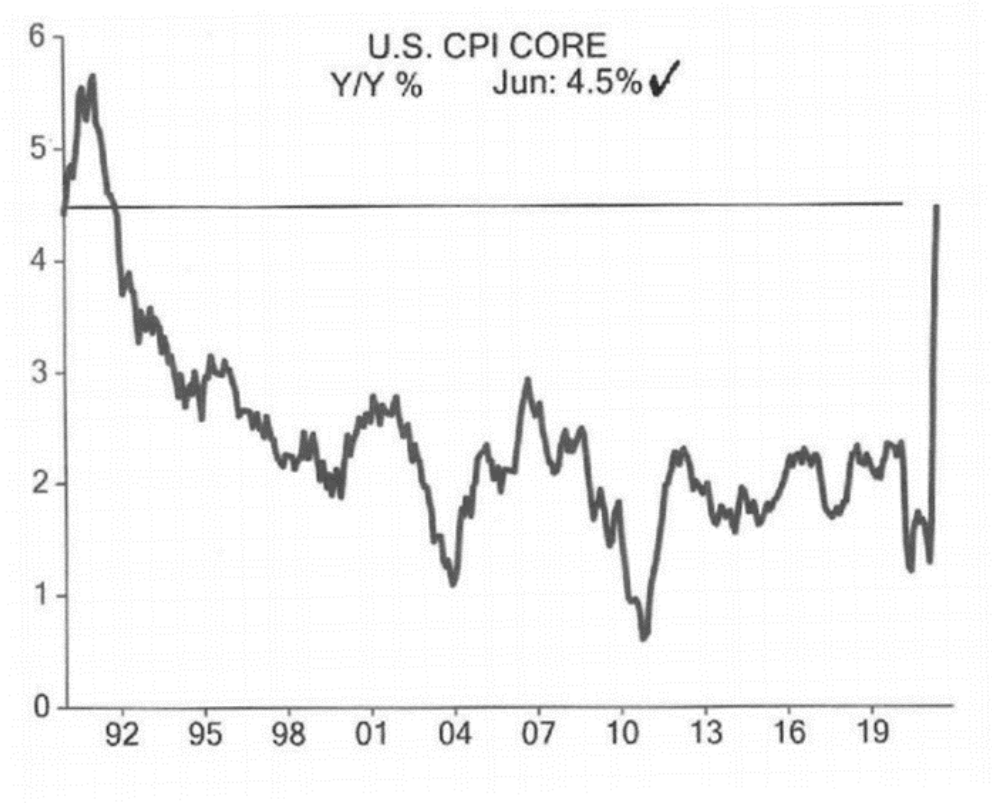
Inflation and the Energy Transition

The COVID pandemic, and the response of governments and central banks around the world, have engendered an on-going debate about the outlook for inflation. Transitory or perhaps a bit stickier? Inflation skeptics rightly point to the remarkable deflationary impact of technology and innovation as well as a labor pool distorted by temporary incentives for the able bodied to remain at home.

Inflation certainly has been benign over the past decade, aided by globalization, demographics and, perversely, easy monetary conditions. Cheap capital combined with distorted and ultimately misplaced definitions of value creation in the natural resource space resulted in significant excess supply which depressed commodity prices. Indeed, from the Global Financial Crisis through the second quarter of 2021, the S&P GSCI price component has averaged 3.5% annualized returns, almost 70% lower than the annualized returns of the prior seven years (2002-2008). And that includes the 65% return of the last 12 months.

We have written for the past few years that we believed that inflation expectations were far too sanguine, at least from a commodity price perspective. The reason was simply that the industry was being starved of capital – a rational response to a decade of value destruction which inevitably set the stage for higher prices. For the most part, this recovery has materialized in the spot market, although futures prices remain less robust. In general, current commodity prices are at or above what we consider reasonable long-term averages.

Some will argue that this set-up is the essence of transitory inflation – the second derivative for commodity prices, rents, wages, etc. could all end up being negative. It is hard to imagine how to comp a chart like this with positive year-over-year growth.



Source: Evercore ISI, July 13, 2021

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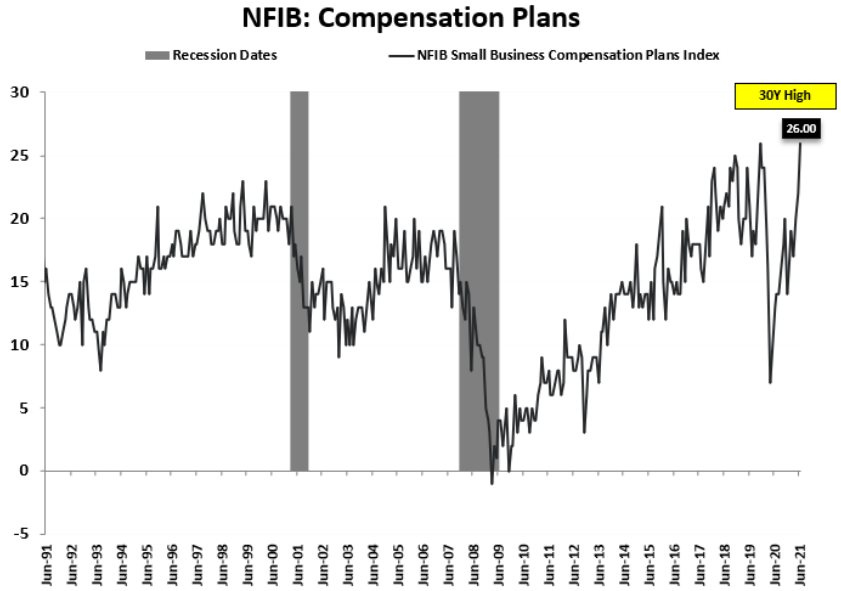
However, other components of price indices look more constructive, including on the labor side, where small business compensation costs appear as if they have resumed their upward trend.



Source: Hedgeye, July 13, 2021

The following chart sums up the conundrum pretty well – pricing power for most industries has improved dramatically even vs. pre-COVID periods, but many companies expect the trend to moderate going forward.

How Do You Expect Pricing Power To Be In 6 Mos.?

% of responses

	Better	Same	Worse
Consumer Cos.	0%	69%	(31%)
Real Estate Cos.	25%	38%	(38%)
Industrial Cos.	(50%)	30%	20%
Employment Cos.	0%	83%	(17%)
Total	19%	55%	26%

Source: Evercore ISI, *Company Surveys,* July 14, 2021

We don't have a great framework to address the inflation debate from a demand perspective which from our experience is extraordinarily difficult to forecast. On the margin, we are in the "sticky" camp, in no small part because the recent rounds of governmental largess have ended up in the hands of the consumer as opposed to the producer.

From a supply perspective, we continue to believe that costs will be higher than most are expecting. This is due to three primary factors.

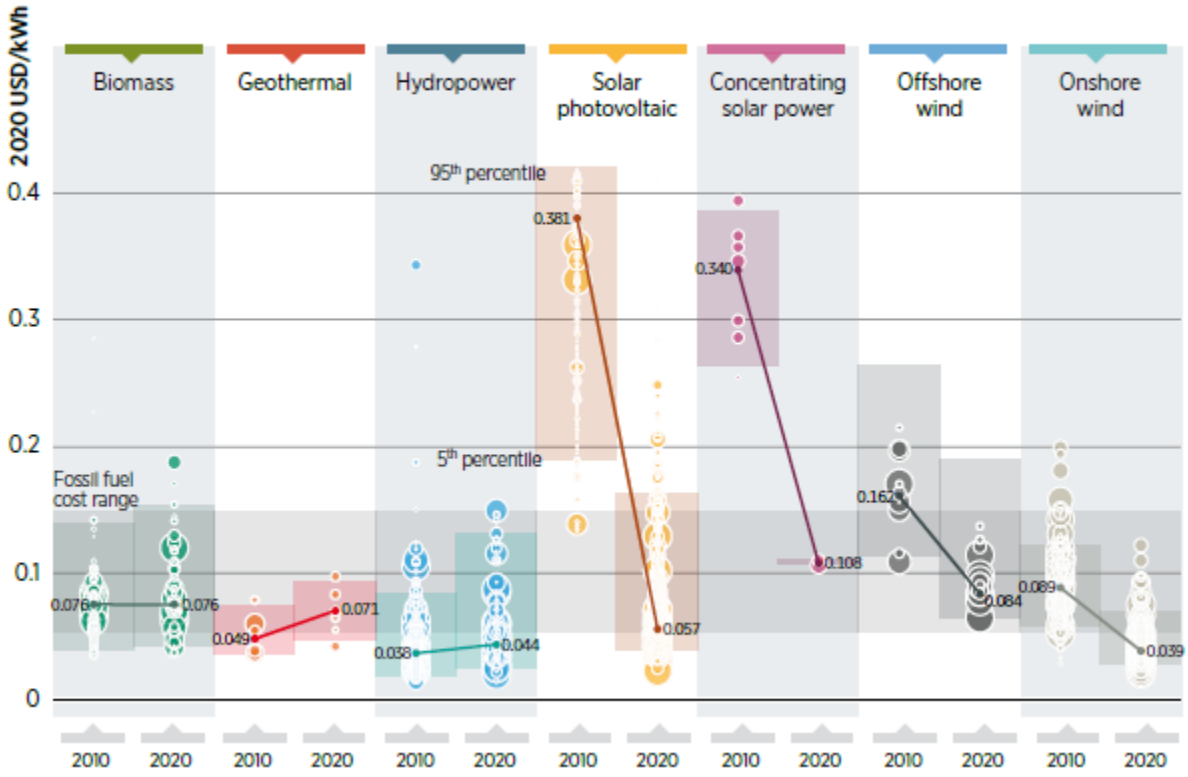
1. As we have discussed in previous letters and white papers, there are ***significant structural headwinds facing many commodities that will require strong incentive prices just to meet current demand***: grade degradation, core exhaustion, limited and shrinking external supplies of capital, a lack of game-changing technological innovation to name a few.
2. Moreover, policy makers (public and private) and most investors continue to ignore the material requirements of the Energy Transition. To reiterate, ***investors and government authorities who choose not to capitalize or advance well-managed, low-carbon footprint upstream projects because of overly simplistic/detached-from-reality ESG stances are doing far more harm than good*** to the ultimate objective – the decarbonization and broadening of the world's energy systems.
3. ***The Energy Transition may in and of itself be far more inflationary than most expect.***

This last point is worth considering in more detail. Our sense is that most investors and policy makers believe that Energy Transition will be a massive net benefit for the world's population and the global economy. As the International Renewable Energy Agency put it in their World Energy Transition Outlook 2021, "The analysis of global socio-economic impacts…indicates that the world will be better off – in multiple dimensions – if societies take the 1.5 C Scenario route…(which) offer(s) a 11% improvement in the overall Energy Transition Welfare Index over the (Planned Energy Scenario)".

While forecasting how the largest investment and industrial undertaking in the history of mankind will impact global welfare with that level of precision may remind some readers of their recent experiences with shale well economics, the fact remains that most believe that the Energy Transition is not a cost, but an opportunity.

Many scenarios are predicated on a continuation of technology-driven cost reductions, mirroring the rapid decline in renewable levelized cost of energy ("LCOE") over the past decade.

Global LCOE of Newly Commissioned Utility Scale Renewable Power: 2010 and 2020



Source: IRENA, *World Energy Transitions Outlook,* June 2021

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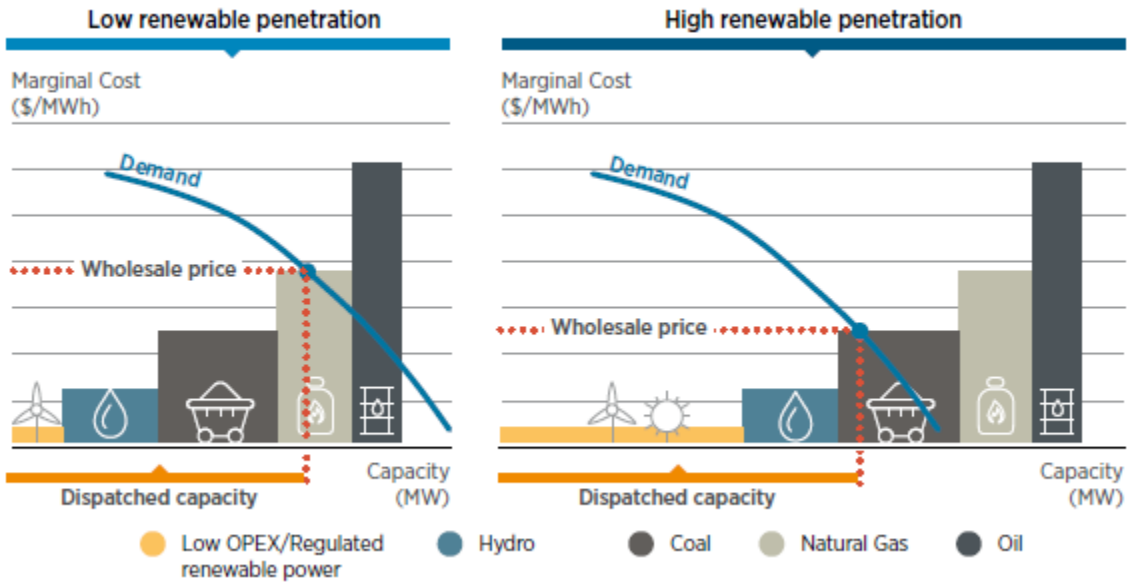
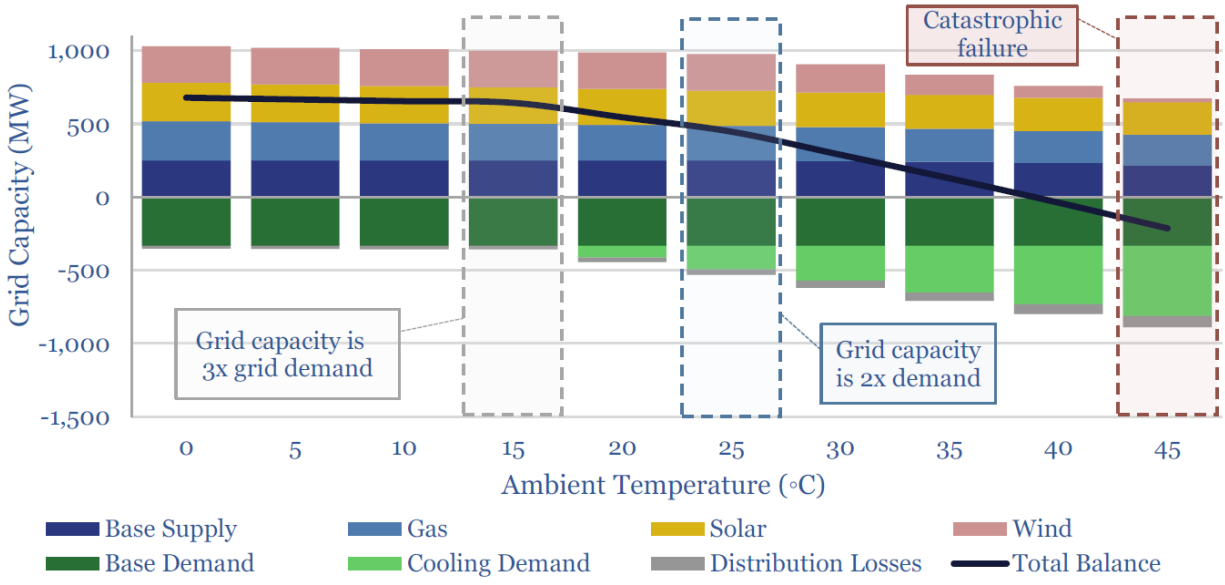
Renewables have extremely low or even negative variable cost after tax credits are taken into consideration. This should translate into low-cost power, surely a net benefit to the consumer.



Source: IRENA, *World Energy Transitions Outlook,* June 2021

The challenge, of course, comes when intermittent power sources comprise a larger and larger portion of the power stack. To be clear, "intermittent" does not necessarily equal "renewable", as Winter Storm Uri exposed. Power markets which do not provide sufficient incentives for stable, robust generation are apt to fail during periods of stress – exactly the time when power is most important. This is the definition of "fragile", as defined by Nassim Taleb.[1]

Creating an "anti-fragile" grid requires investment, which will necessitate higher prices. ***The more variable dispatch capacity that is added to the grid, the more expensive energy will be because we (the consumer) will need to pay for expensive (rarely used) stand-by capacity, storage, transmission and distribution infrastructure, etc.***



Source: Thunder Said Energy, *Energy Transition: Top 10 Controversies,* July 12, 2021

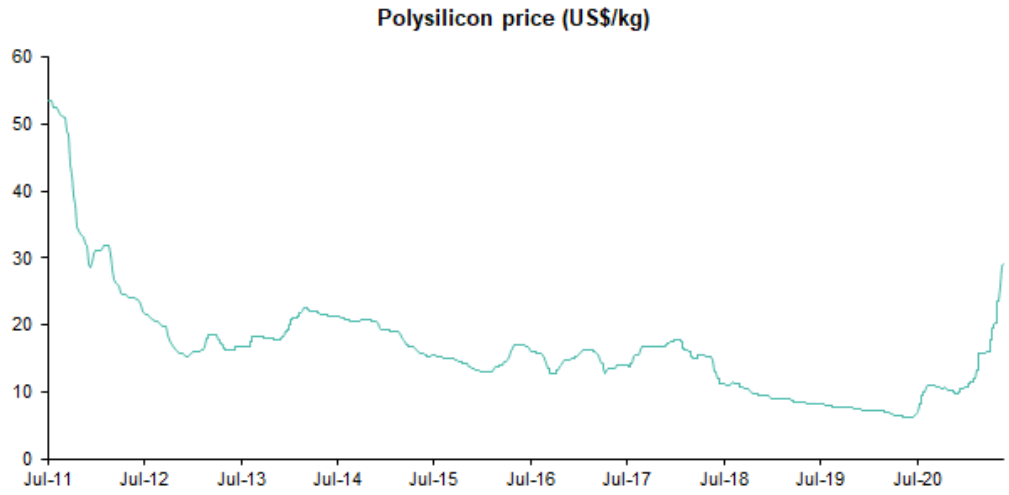
[1] *Antifragile: Things That Gain From Disorder*, Nassim Nicholas Taleb

In fact, based on Thunder Said Energy's analysis, power stacks comprised of more than 40-50% renewables will face significantly higher costs due to the investments required to maintain a stable dispatch capability. This is well below the range in most accepted "scenarios" which assume 70-90% renewables in the future.

In addition, while renewable LCOE's have fallen dramatically over the past 20 years, there are constraints to future cost reductions. Even Moore's Law, every optimist's favorite example of the power of technology, is beginning to break down due to physical limits of gate size, source-to-drain leakage, etc. Again, the ***parallel to the shale boom is too obvious to ignore - assumptions of evergreen technological advancements and productivity gains work extremely well in spreadsheets but rarely manifest themselves in the real world where the laws of physics tend to be much harder to ignore.***

It would be a mistake to assume that input costs will fall into perpetuity. Anything that adds to the cost of production - whether it be a carbon tax, maturing geology, an increasingly challenging regulatory backdrop or changes to fiscal terms – is ultimately passed on to the consumer. This is one aspect of commodities that is often underappreciated – both the producer ***and the consumer*** are price takers. This conclusion is relevant when considering the outlook for mission-critical commodities like copper and lithium, but also downstream commodities like polysilicon.

It's clear that at least a portion of the drop in solar LCOE has been driven by 90+% decline in polysilicon prices between 2011 and 2020.



Source: Bernstein Research

Like many other commodities, polysilicon prices have recovered more recently. While it seems reasonable to expect that current prices will engender a supply response, future price expectations are almost double the recent lows despite a trebling of capacity.

Polysilicon Supply/Demand and Price Expectations

thousand tons	2019	2020	2021E	2022E	2023E	2024E	2025E
Polysilicon demand	412	437	563	661	788	940	1121
growth	*8%*	*6%*	*29%*	*17%*	*19%*	*19%*	*19%*
Producton capacity (Average)	**628**	**641**	**656**	**831**	**1185**	**1475**	**1626**
Total global capacity (Year end)	643	638	758	927	1442	1507	1745
Demand/Production ratio	**0.66**	**0.68**	**0.86**	**0.80**	**0.67**	**0.64**	**0.69**
Industry ASP (USD/kg)	**8.2**	**8.3**	**18.0**	**14.0**	**10.0**	**9.0**	**11.0**

Source: Bernstein Research, *Bernstein Energy & Power,* May 21, 2021

Furthermore, about 70% of polysilicon is manufactured in China using…wait for it…cheap, coal-fired power. A $100/ton carbon tax would more than double the prices shown in the table above. For any commodity, cost inflation results in price inflation.

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Lastly, it is important to note that in many cases, renewable installations are struggling to meet modeled parameters. A recent study by kWh Analytics found that incidents of ***persistent underperformance of solar installations were 13x greater than anticipated over four years***, while ***degradation rates were running 50-140% above the industry standard modelling assumption.***[2] This real-world variability will impact both realized investor returns as well as grid reliability and, therefore, energy costs.

From an investment perspective, the outlook for a more inflationary Energy Transition has important implications.

1. Higher costs will translate into higher prices – this may ***slow the pace of the Energy Transition, an outcome which we believe is virtually assured anyway*** due to the inability of the raw material supply chain to meet the demand inherent in virtually all 2050 net zero scenarios.
2. Higher costs will require ***investors and policy makers to better understand the carbon abatement cost curve and to focus investments on the most capital- and cost-efficient means of decarbonizing our energy systems*** while expanding energy access in the developing world.
3. ***Realized returns on downstream assets such as renewable power installations may be significantly impaired*** by the combination of higher product costs, higher than expected maintenance costs and lower/more variable output. Conversely, ***the outlook for critical enabler commodities as well as the owners of long-duration, low-cost producers of these commodities is as attractive as we have seen in the last 25 years.***

Why does this matter? Hundreds of billions of dollars have been invested in the Energy Transition already, and a hundred plus trillion will need to be deployed over the next three decades to achieve the mission's two primary objectives: carbon abatement and addressing global energy poverty. Despite the massive material requirements of this undertaking, and the incredible valuations that exist today for many mission-critical projects, ***the majority of investors appear to be anchored in a deflationary world view, bound by overly simplistic ESG considerations.***

Capital allocators who are serious about achieving net zero status while assisting the billions of people facing energy poverty on a daily basis must actively find opportunities to expand the supply of raw materials necessary to increase the supply of clean, abundant energy. Capital allocators who have a mandate to identify and exploit uncorrelated return streams must look beyond the convenient, well-trodden path of renewables and EV's where much of the blue-sky scenario is already reflected in asset values and find ways to gain exposure to the same structural trends but with a free option on the unknowable future. And, lastly, capital allocators charged with preserving the long-term purchasing power of their portfolio must find assets classes which both benefit from inflation and where the premium on that insurance policy isn't so onerous that it defeats the purpose of insurance to begin with. We believe that we are in the very early stages of a cyclical recovery which is coinciding with one of the most important and material-intensive undertakings in the history of mankind. We look forward to helping our clients achieve the emerging dual objectives of the institutional investor – to do well *and* to do good.

[2] kWh analytics, *Solar Risk Assessment 2021*