Disruption | Fund

31 October 2021

"The difficulty lies not so much in developing new ideas as in escaping from old ones."

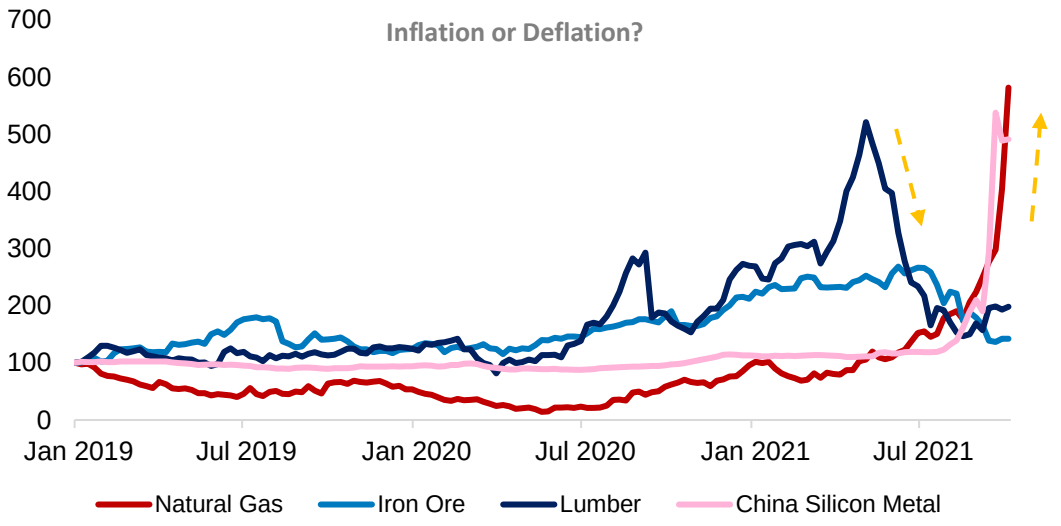
— John Maynard Keynes, 1930

Low carb(on) breakfast, oily dinner

Halloween is in the air, literally, on the flight path from Rome to Glasgow to Vienna. It's all about the costume. Fashion conscious at the G20, Extinction Rebellion outfits for COP26; snake oil and wildcatting boots at OPEC headquarters. Three parties, three outfits, one crowd. Trick or treat? Timing is everything, even with parties, so there it is, an oil and gas panic in the middle of the biggest ever climate conference. For Joe Biden, Boris Johnson, Xi Jinping, changing outfits at 30,000 feet, there will be plenty of face masks to choose from. The Green New Deal president angling for more Saudi oil; the Brexit champion begging for Russian gas; the Common Prosperity leader discretely hoarding LNG shipment "whatever the price". Gulfstream jet, no layover. Soundbites and Twitter feeds, the show must go on. And that's just how the cookie crumbles.

From Goldilocks to Stagflation?

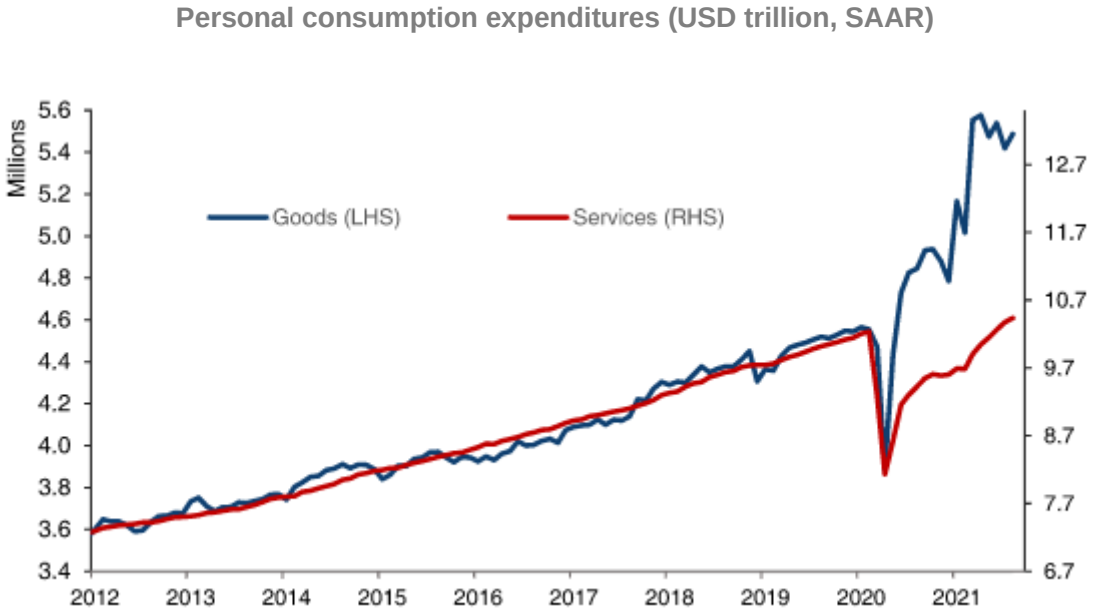
Macro discussions can quickly turn to barstool chatter. And yet, the big picture matters. Are commodity prices rising or falling? Are we overheating or fast cooling? Expansion, recession, stagflation? All of the above. The demand side is booming with full employment and record savings. There are no inventories of anything. No cars, no homes, no building supplies, no computers, and evidently, no natural gas. Production confusion and panic buying. Natural gas, container shipping rates, coffee and cotton, polysilicon (solar panels), semiconductors, all up, while iron ore, lumber and copper, are down. Need a new bike or an EV, you better pay up; build a new high rise in Shenzen, you might end up in jail. A supply-demand mismatch with an energy squeeze spells recession. Welcome to the first stagflation in 50 years.



Source: Bloomberg ; base 100 = 1 Jan 2019

The Covid pandemic takes the blame again. Since the lockdown lows of March 2020, we have seen sharp swings in working habits, spending patterns, investing behavior, travelling needs, setting new trends in many sectors. You'd expect global supply chains to have adjusted by now; they haven't. Most likely, they won't. **Consumer, corporate and government wants are changing too fast.** Global supply chains were not designed to cope with an EV boom, onshoring, and Industry 4.0 robotics. Producers are still figuring out what it is people want, let alone producing much of it.

A tale of two recoveries



Behind all this confusion sit two powerful trends : **free money** and **decarbonization**.

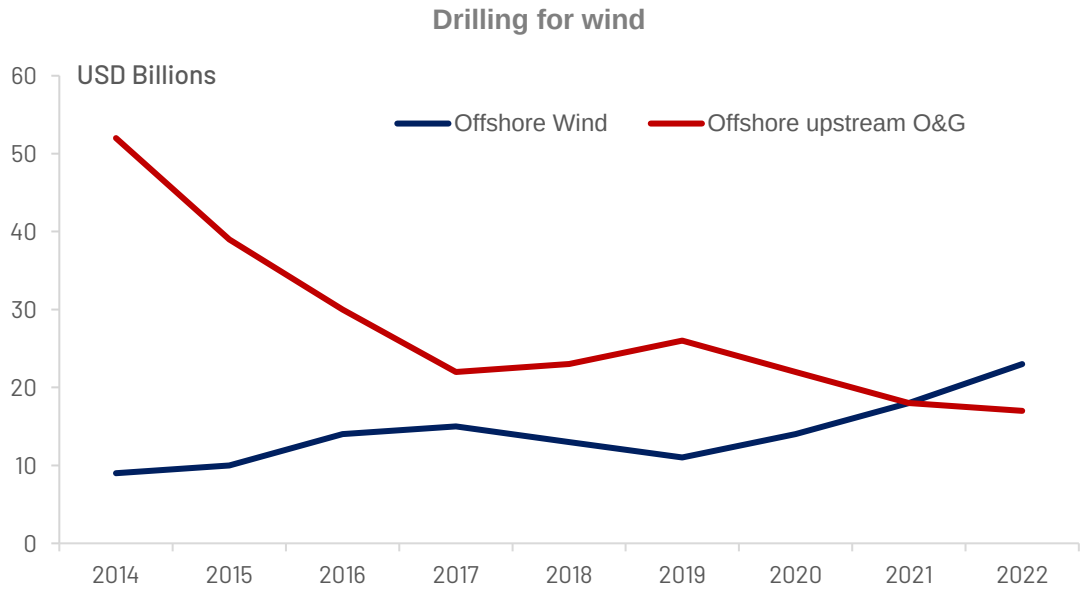
Free money works wonders in economics. Not since Keynes invented monetarist therapy for World War II recovery had we consumed so much. The stimulus-rich consumer boom of 2020-21 has gone straight to automobiles, home improvement, and e-commerce. These industries were not prepared, nor was the supply chain. Looking out to 2022, the collateral inflation is getting too hot to handle, pushing central banks into tapering and rate hikes at the same time as China enters its first recession in investor memory, and as OPEC holds the world to a green ransom.

We see limited scope for relief as the coming capex boom of the 2020s is oriented towards Clean Tech (EVs, hydrogen), Cloud infrastructure (Semis, hyperscale data centers), and Industry 4.0 (3D printing, robotics, IoT).

Enter decarbonization.

Left alone, energy prices too were subject to tech deflation. The shale oil and gas revolution of the 2010s was deeply deflationary, brought down the oil price for 12 years, and killed the Clean Tech boom of the 2000s. It could have continued, with average shale oil per barrel costs falling from $50 in 2010 to $30 today (source: EOG Resources). But climate change policies joined the conversation, pushing investors to defund shale, coal, and most fossil fuels. ESG investing, compounded by China's attempt to accelerate coal-to-gas switching, has added to the shortage in oil and gas.

We can't forecast the oil price, but **we wouldn't be surprised by a return to the $100 oil that preceded the US shale boom, and with it, paradoxically, an acceleration in the Clean Tech revival**.



Source: Rystad Energy research; OffshoreWind.biz

Greenwashing, Greenflation, Greenmail

The energy transition is a complicated mix of technology, politics, and consumer wants.

In 1973, following OPEC's first major oil embargo, Exxon immediately funded solar panel research, producing the first polycrystalline solar panel. In 1979, Jimmy Carter installed solar panels on the White House roof. Raise the oil price and innovation flourishes.

In a dream world, the green energy utopia starts with renewable electricity (solar, offshore wind, geothermal, hydro, carbon capture pumps, and logically nuclear), stored during peak times (sunny, windy, rainy), across ubiquitous battery systems, and dispatched through the grid when and where needed. In addition, by 2030 or so, these renewable power plants could reach sufficient scale to also feed electrolyzers for green hydrogen, the closest thing to a net zero fuel with an infinite recyclability.

Already, solar and wind electricity has reached grid parity with conventional power in many parts of the world, but capacity is still minuscule (below 10%), and, more importantly, efficiency is poor due to a lack of the critical battery systems needed for distributed energy storage. Without these battery systems, clean energy is green in name only.

Barclays Research reports (Oct 2021) suggest US stationary storage (batteries ex-EVs) spending is likely to rise from $2b in 2020 to a range of $7b to $20b/year mid-decade. With the US comprising only 16% of global power, global storage spend would arguably be closer to $1 trillion (base case) to $4 trillion (net zero), with additional spending on storage software and services.

As large centralized and top-down managed power plants are replaced with millions of distributed energy resources (DERs), energy storage will play a key role in integrating various digital and interconnected "grid edge" technologies. Opportunities include aggregating DERs into virtual power plants (VPPs) that can be controlled, optimized, and dispatched similar to a conventional power plant.

Meanwhile, the world is held hostage by China's greenflation and OPEC's greenmail.

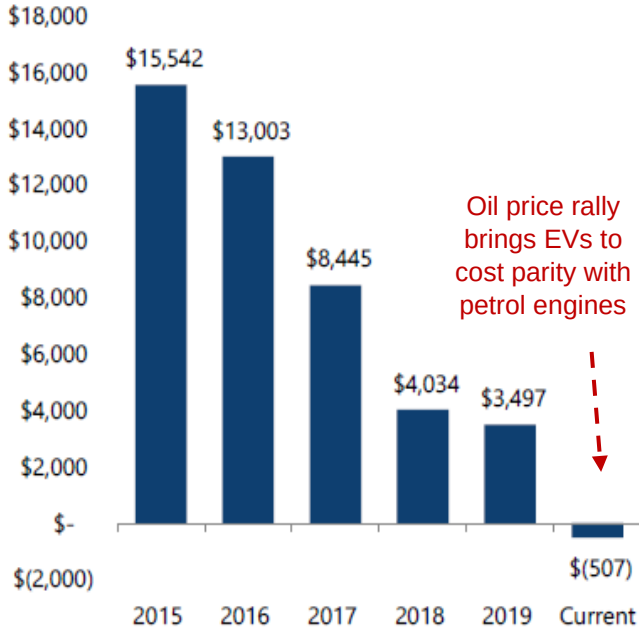
China, the world's largest CO2 emitter (in absolute terms, not per capita), has embarked on the simultaneous mission to switch its electricity from coal to gas, and to dominate EVs, PVs (solar panels) and batteries. China is adopting and producing EVs at the fastest rate of any geography. China also dominates the world's solar panel production, with 97% share of silicon wafers production, 79% share of

PV cells and 67% share of polysilicon, all predominantly manufactured with coal fired electricity. As for batteries, China's CATL and BYD together produce near 40% of the world's total in 2021 (Source : JP Morgan). Being the cost leader in renewable energy technologies holds the world hostage to China's energy import prices.

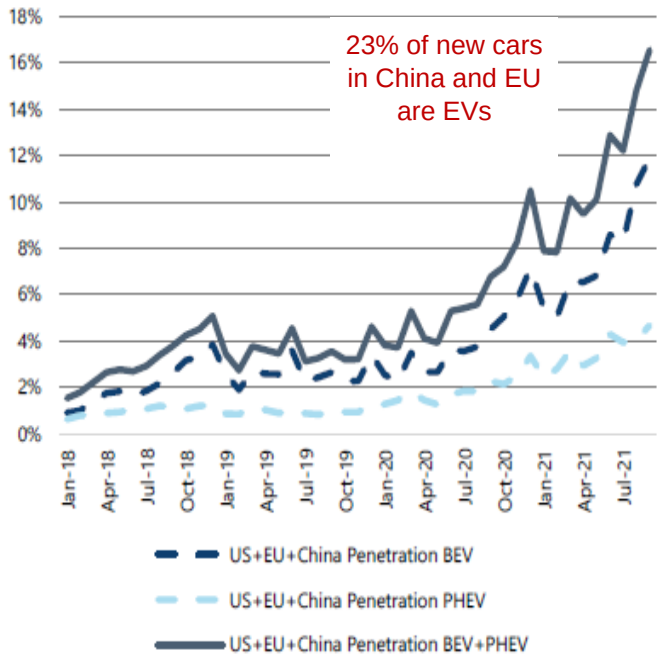
This renewable supply/demand conundrum has restored the power of OPEC+. **Vice or virtue, we see disruption across all energy markets and have moved the portfolio from 15% to 25% Clean Tech, with one industry in particular having become the battleground for decarbonization: Automobiles**.

As mentioned earlier, the critical ingredient of the Clean Tech revolution is the drop in battery costs. Tesla alone made the difference, pushing suppliers Panasonic, LG Chem and CATL to the symbolic $100/kwh parity with petrol engines in 2021. **Now, the US, the least subsidized market, joins China and the EU where EV/ICE cost parity has arrived.**

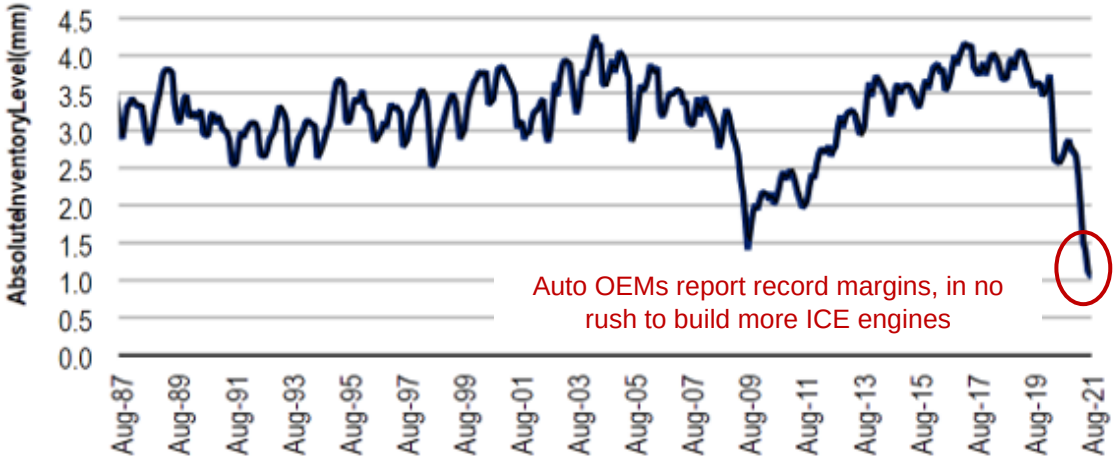
Historical US ICE vs EV lifetime affordability tradeoff



Monthly US + EU + China EV Penetration



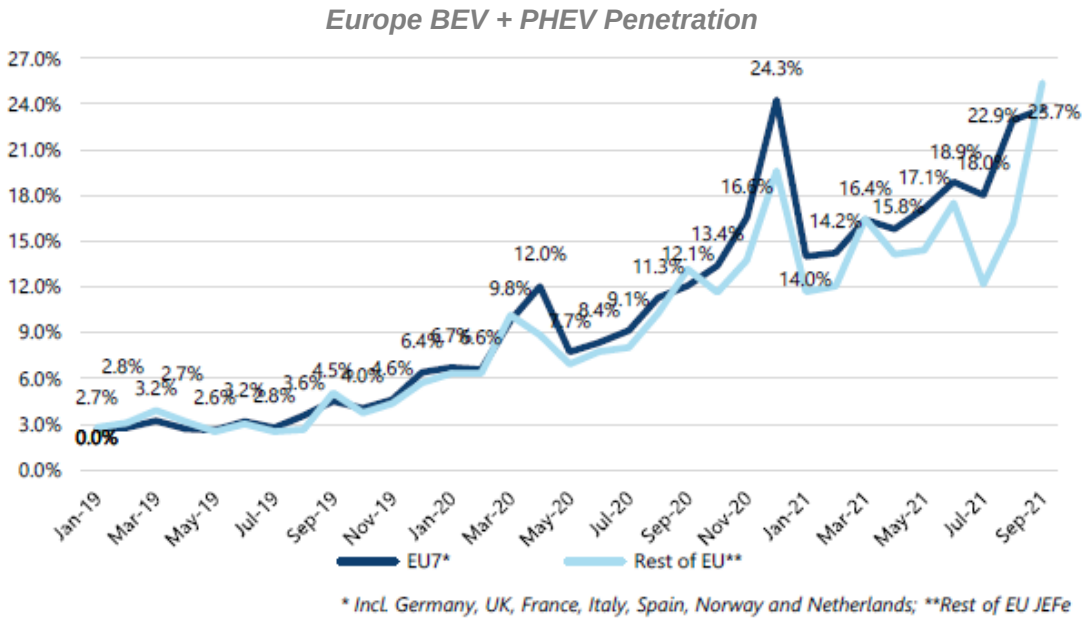
Total US Auto inventory (million units)

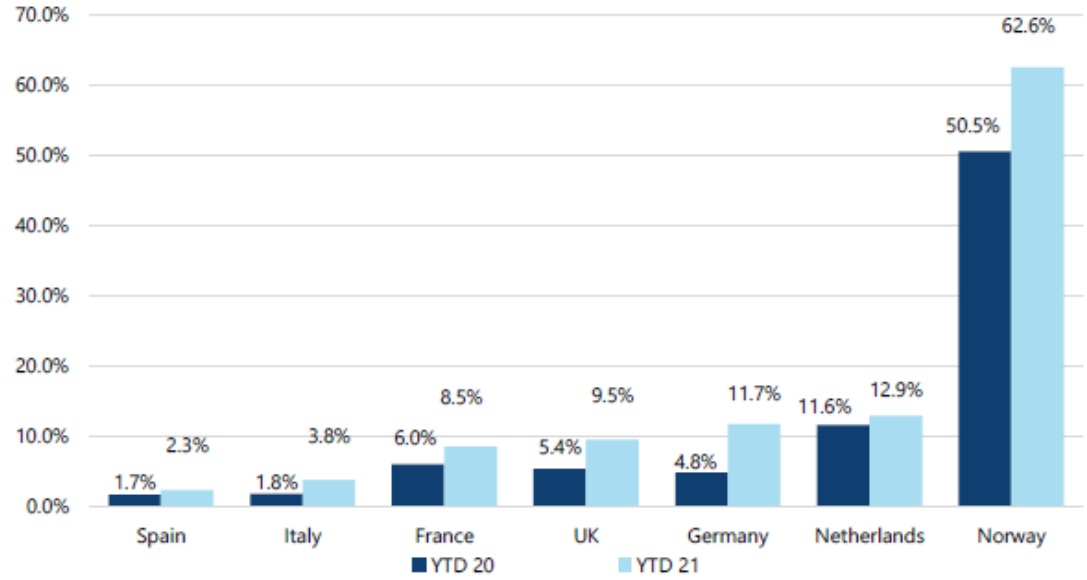


Source: Jefferies estimates, BofA Research, Wards Auto, US Energy Information Administration

Panic in Stuttgart

The Auto sector is fraught with semiconductor shortages, production cuts and near zero inventories. It's also at a unique inflection point. Consumers are flocking to EVs in record numbers. **The bestselling car in Europe in September, all power trains combined, was the Tesla Model 3, entirely made in China.** Shortages, rising fuel prices, city planners blacklisting combustion engines, all combined with shifting consumer tastes, make for serious panic in Stuttgart. On Oct 16, the CEO of Volkswagen, Herbert Driess, convened a conference call with 200 executives across the company to listen to surprise guest Elon Musk for a 1 hour Q&A about the challenges of electrification. Germany Inc is rushing to convert capacity to electric powertrains, and to scale up battery production as fast as possible.





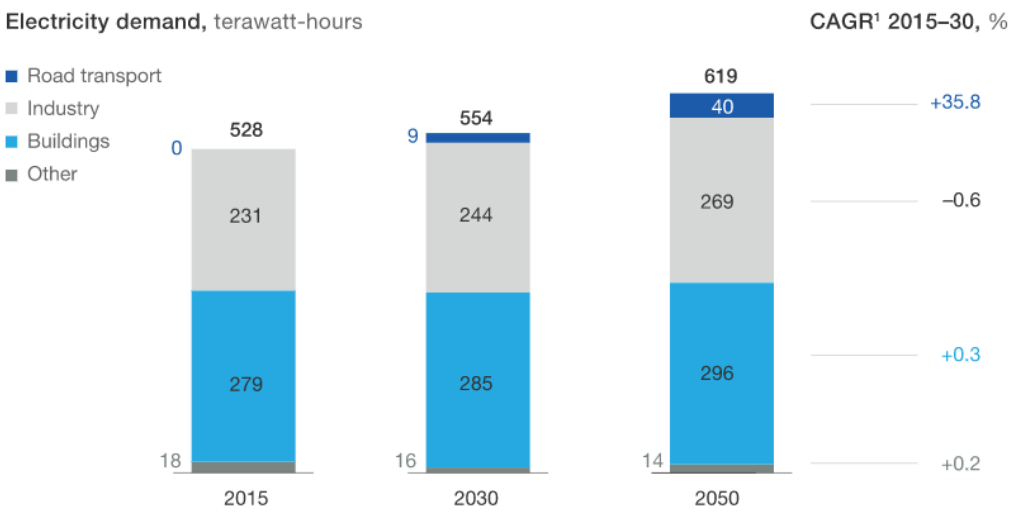
Source : Jefferies estimates, ACEA, InsideEVs

How fast can EV adoption go? Norway hit 62% BEV share of new cars in 2021; 84% if you add hybrids. The EU7 average right now is 24%, a milestone passed by Norway in 2016. We think if production rates and infrastructure can keep up, **60% to 80% of new cars in Europe could be EVs by 2025**. Consensus research models are currently at 50%. The race is on.

Panic in Berlin

Could auto electrification cause a major shortage of electricity? According to McKinsey Institute, taking Germany as a case study, EV growth adds about 1% to total electricity demand by 2030, and 5% by 2050. Manageable. The most pronounced effect will not be power consumption but load factors. Storage solutions—the rationale behind Tesla's Powerwall and solar panel roofing businesses—are therefore critical to capture energy during peak production times in order to release it during evening peak loads, as people and public transport systems plug in their EVs.

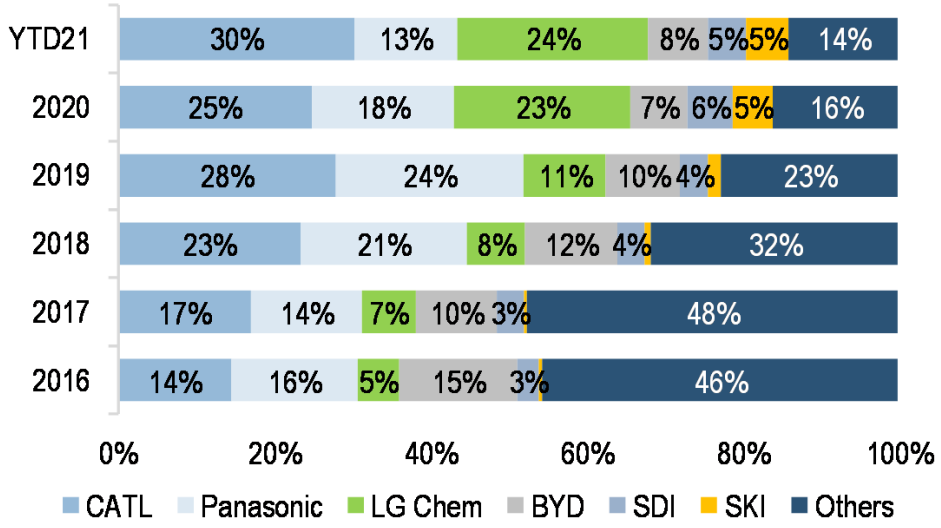
Germany electricity consumption on path to 90% electrification



Source : McKinsey Center for Future Mobility

For now, energy storage is a battery business, and a big concentrated business at that. CATL, LG, Panasonic and BYD control 75% of global supply. In Sweden, Northvolt is winning mega orders from the most aggressive electrification enthusiasts Volvo, Volkswagen and Daimler. A switch from Lithium-ion to Lithium Iron Phosphate (LFP) is in the works. But batteries are heavy and expensive and remain a recycling headache. In time, the transport market will split between EVs for short ranges and city life vs hydrogen for heavy loads, long ranges and long distances.

Global EV battery shipment market share by player



Source: SNE Research, J.P. Morgan.* YTD-21 = Jan-Aug 2021

The perfect energy storage system is hydrogen. Its energy density is the highest of any known substance (3x diesel) but it's very low per volume unit. It either takes a lot of space or requires very high pressurization. Luckily, the industrial gas specialists and the LNG food chain are partially equipped to deal with hydrogen. H2 can be mixed with methane and other gases to travel via pipeline and can be stored alongside natural gas. Ships, trains, heavy trucks, even airplanes are likely to be hydrogen powered in the future. **The missing link is renewable electricity: solar and offshore wind need to ramp.**

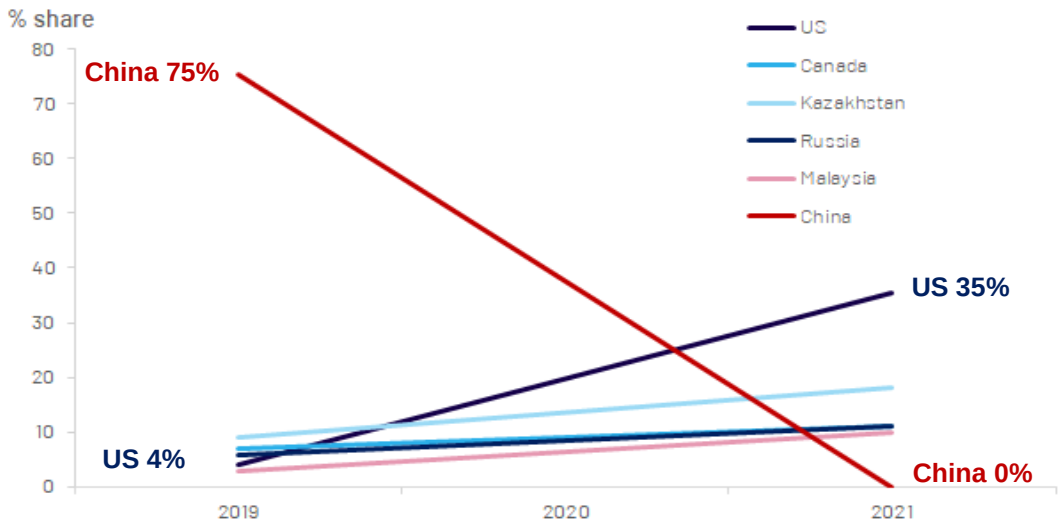
The hydrogen solution is ambitious and expensive, but **OPEC is likely to find its place**. Saudi Arabia is planning to become the world's largest exporter of blue hydrogen (gas fired electrolyzers) by 2030, and green hydrogen (solar powered electrolyzers) by 2050. Phase 1 is a planned massive desert wind and solar deployment called **Helios**, managed by the former CEO of RWE and Innogy. The wind and solar farm will produce 4GW of 100% renewable electricity to power the largest hydrogen electrolyzer station in the world by 2025. US company **Air Products** will convert the hydrogen into ammonia and ship it in solid form to global destinations before reconverting it to H2 gas to power fuel cells. We expect more similar announcements.

Gradually, suddenly, and then some

Volatility in energy didn't take it away from cryptocurrencies.

In May this year, China outlawed all forms of crypto mining, trading, and holding. As recently as 2019, the Middle Kingdom held 75% market share in Bitcoin mining vs 4% to the US. Today, China's share now is 0% vs US 35%; Canada, Malaysia, Kazakhstan and Russia took up the slack. During that time, Bitcoin suffered a 53% drawdown (April 13, to July 20). Then in October the SEC authorized futures-based crypto ETFs, pulling Bitcoin to a new all-time high at $66,000 on Oct 20. **The resilience of Bitcoin vs the toughest regulatory decision ever should be seen as a major victory for the robustness of decentralization and cryptocurrencies.**

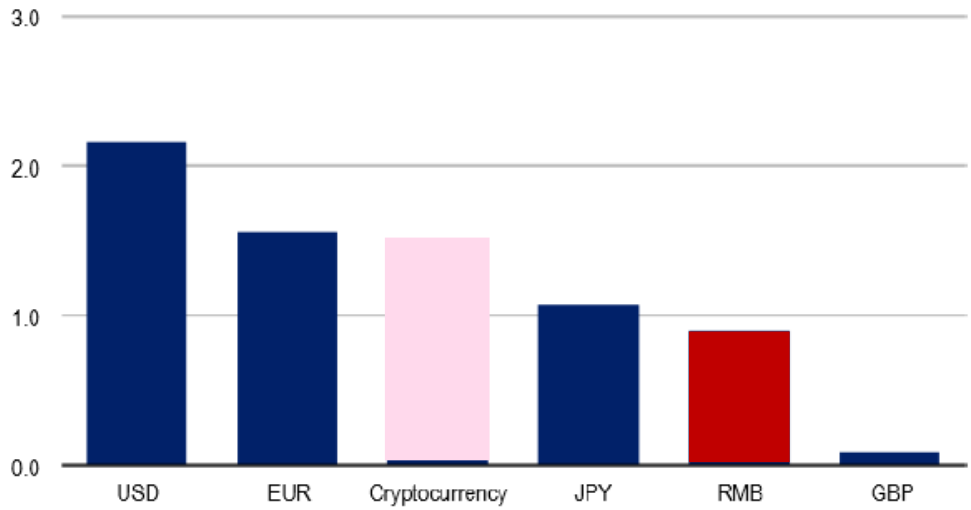
Share of global Bitcoin hash rate



Source : Cambridge Center for Alternative Finance

We think this "test" will increase confidence in high inflation countries that Bitcoin can protect savings. El Salvador, Nigeria, Turkey, Argentina, Vietnam, Pakistan, Venezuela, all are seeing fast rising adoption of crypto wallets. DF owns a 1.8% position in Bitcoin via the Van Eck Bitcoin ETN.

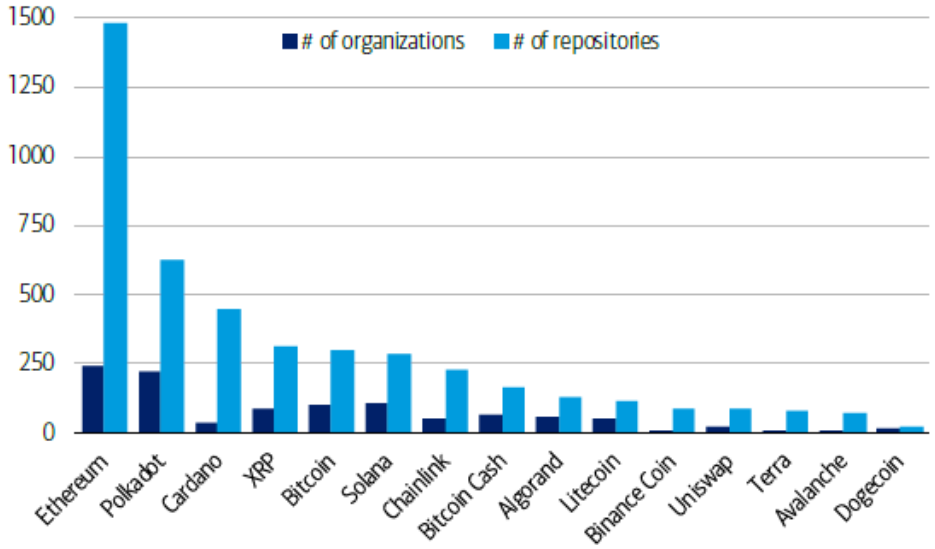
Total currencies in circulation



Source : BofA Research, Central Bank Websites

We continue to believe in the **cryptocurrency model for launching new software projects**, and the **central role of Ethereum as an alternative to centralized cloud services by Amazon AWS, Microsoft Azure and Google Cloud**. On Oct 29th, Ether reached an all-time high, driven by the gradual embrace of Ethereum 2.0, a shift from Proof of Work to Proof of Stake. On August 5th the Ethereum Foundation introduced EIP-1559, a mechanism to replace ETH "rewards" with ETH "burn". The equity equivalent would be replacing dividends with buybacks. More than 600,000 ETH have since been burned, worth close to $2.5b. the mix of mining and burning introduces an inflation/deflation narrative that should help balance the value capture between miners and holders.

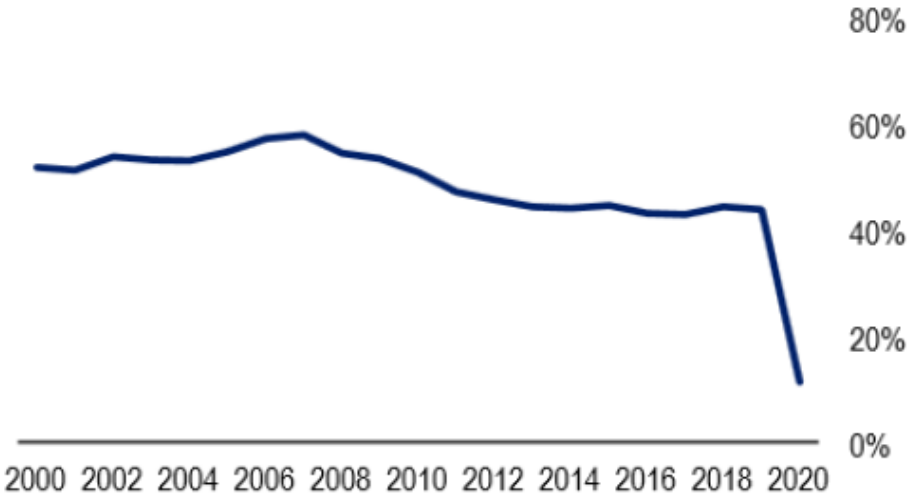
Blockchain repositories/projects on the top 15 cryptos by market value



Source : BofA Research. Data as of 13 Sept 2021; excludes Stablecoins

Meanwhile, physical notes & coins never recovered from Covid

Circulated physical notes & coins as % of M1 for the US fell to 11%



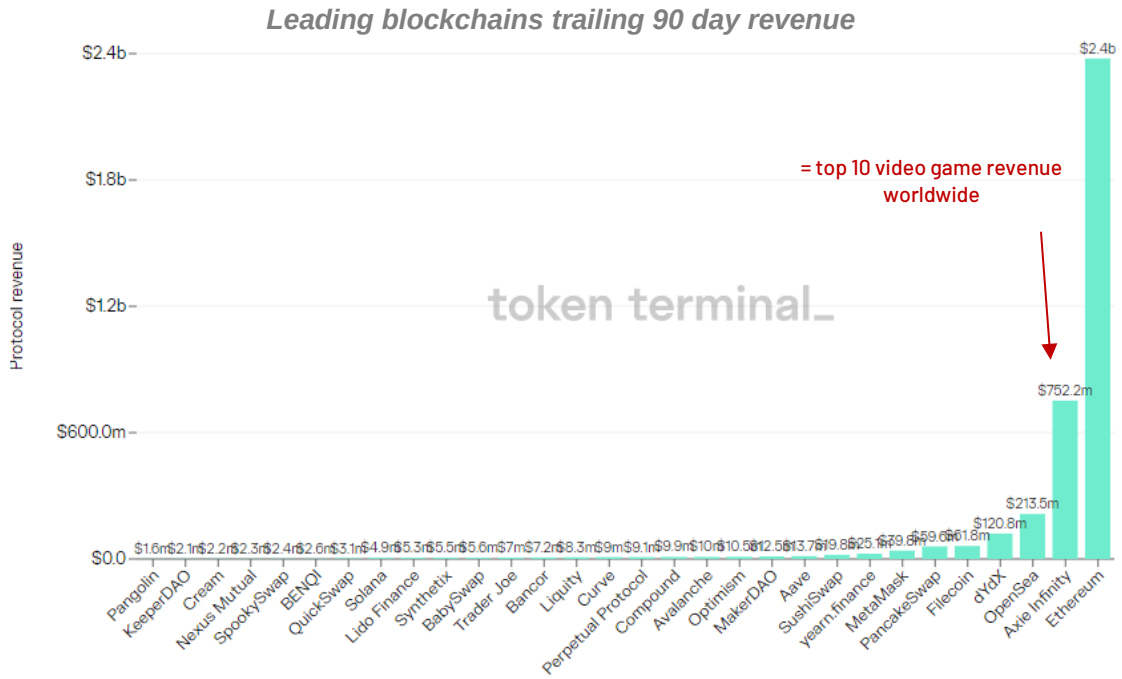
Source : BofA Research.

GameFi

GDP too can be virtual.

This month, Facebook renamed itself Meta. The company isn't just trying to deflect attention from its endless scandal of personal data and fake news, they are accentuating the vision that started 7 years ago with the acquisition of Oculus: **build an alternative virtual reality, a space where people can play, learn, and make a living.** This alternative universe recalls *Second Life*, a video game that was too early for its time, and Ernest Cline's *Ready Player One* novel from 2011.

While our own Q2 letter was on the *metaverse* last July, the metaverse announcement by Zuckerberg & Co. coincided with *Axie Infinity* making front page news for becoming the second highest revenue (*) blockchain after Ethereum. Axie is the star of the emerging **GameFi space: video games where players buy, "grow" and "breed" NFT avatars that can earn income and capitalize resale value.** Profits from the NFT issuance are used to burn Axie (AXS) tokens (aka a stock buyback), pushing up the value for everyone's benefit. **In its own way, the game is a mini economy, expanding and contracting with the investments, work and spending of its gamers**. The game has close to 2m registered players, of which 250k play every day (*Source : The Verge*). Andreessen Horowitz was a lead investor in early October at a $3b valuation.



*Source : token_terminal ; (*) **Protocol revenue = share of fees that go to the protocol's treasury or directly to its token holders through e.g. a burn mechanism. The burn mechanism is similar to a stock buyback because it decreases the amount of tokens in circulation.***

The game has become a significant source of income in countries like Brazil, the Philippines, Venezuela and Vietnam. It's become so popular in the Philippines, that the government has expressed its intention to tax Axie players (Source : Coindesk)

With Axie generating "gross revenues" equal to a AAA video game franchise, we think the metaverse theme is a major unchartered territory of potential wealth creation for creators as well as players. The video game industry is likely the best place to be in this theme. We bought Ubisoft Entertainment right after they reported Oct 29.

Performance Update & Portfolio Outlook

DF is investing across several themes of Tech, Clean Tech and Biotech. The Clean Tech revolution is on and despite the volatility we have made it our largest sector at 25%. Fintech is our second biggest at 20%, with Semis in third place at 12%. Biotech is 7.5%.

Our performance from June 30 to 29 Oct added 4.84% for a YTD performance totaling 13.22%.

Our top contributors since June 30 were **Ethereum, Zscaler, Lightspeed Commerce, Palo Alto Networks,** and **Enphase**. The least helpful were **CRISPR Therapeutics, Graphite Bio, Twilio, Uber,** and **Robinhood.**

Since late Aug, our expectation for a China slowdown combined with supply chain normalization has been totally upended. Energy markets, the supply chain mayhem and China's property market implosion are far worse than expected. The stagflation narrative is taking hold. We see Clean Tech as the collateral beneficiary of both decarbonization and China's common prosperity policy. The biggest macro risk is in China, on the edge of recession. We expect this risk to keep a lid on central bank tapering at the Fed and ECB.

Source : Bloomberg, Jefferies

The October equity earnings season was mixed, with significant supply chain cost inflation across the board, especially in commodities and semiconductors. Production cuts abound, and pricing power is high, especially in durable goods like Automobiles. A late cycle contraction is becoming apparent in advertising budgets and e-commerce spending, affecting some of our Media & Mediatech names (Snap, Twilio), as well as payment focused Fintech holdings (PayPal, Wise).

3Q growth was strong, but some doubts abound for Q4. **We anticipate a capex intensive 2022 across Clean Tech, Cloud related Software and Semis, while reducing consumer exposure.** Our Biotech holdings are unchanged except for our sale of Covid vaccine makers Moderna and BioNTech.

Invisible Tech : Cloud, Infrastructure Software & Semis

At the center of the Metaverse is our group of "invisible tech" companies. Cloud infrastructure remains the heart of the digital economy and **2022 will be a monster year for capex**, driven by both continued **hyperscale deployments** by Amazon, Google, Microsoft and Facebook, and by the **global scramble for semiconductor independence**. The Big 4 cloud providers spent $65b in capex in 2019: they will **spend $141b in 2022 capex,** that's up 117%. The 5-year CAGR is 25%, with Amazon up a stunning 45%. On the semiconductor side, another set of Big 4 companies are raising massive budgets: Taiwan Semi, Samsung, Intel, and Micron are budgeting **$107b for 2022 capex**, up 78% from $60b in 2019… Big numbers.

We own **ASML, SOITEC, Advanced Micro** and **Nvidia**.

After avoiding it since Sept, we added back **Amazon** following their disappointing e-commerce results; their AWS division accelerated again, to 39% y/y, which represents the third acceleration in a row (28%/32%/37%/39% in 4Q20/1Q21/2Q21/3Q21) and the highest level of growth since 1Q19 (42%).

Cybersecurity has long been the top priority in CIO/CTO surveys, yet with few reliable investment opportunities. The emergence of Zscaler, alongside Okta, Crowdstrike, Sentinel One, Palo Alto, Fortinet, Cloudflare, Fastly and Akamai suggests the opportunity is finally uncoupling from IT Service VARs and consultants, creating valuable brands and direct sales reach. We own **Zscaler** and **PaloAlto Networks** and believe the latter will surprise and rerate to a leadership multiple. Our investments in the "invisible" Cloud continue unabated.

We sold **Twilio** as part of our reduced exposure to marketing budgets and Media Tech.

Infrastructure blockchain leader **Ethereum** has been in the DF portfolio for over a year.

DF owns Cloud Infrastructure Software, Services and Semis, grouped here across all verticals:

- Cloud : ***VanEck Ether ETN, Zscaler, Palo Alto Networks, Microsoft***
- Semis: ***Nvidia, ASML, AMD, SOITEC***
- Watch list: ***Agora, Bill.com, BigCommerce, Salesforce, Splunk, Elastic, MongoDB, Palantir, CyberArk, Wallix, Tenable, Rapid7, DataDog, New Relic, Dynatrace, SentinelOne, Twilio, Fastly, Okta, CrowdStrike***
- Private company watch: ***Databricks***

Visible Tech: Fintech

We continue to believe that **digital wallets are like social networks.** Every new user bring an exponential increase in possible P2P transactions, and better still, they are instantly monetizable from day one with trading. Throughout 2021, it's been more of the same. Certainly not a good time to be a bank!

Despite our admiration for **Robinhood**'s ability to create an entirely new experience for retail investors, their high reliance on one crypto (DOGE) and equity options for revenues, as well as their lack of progress in adding new crypto capabilites (esp when compared to Revolut or CashApp) led us switch back to **Coinbase** which, despite high fees, remains the most politically agile and regulatorily "clean" provider of crypto service; we also like their institutional business which is likely to make them the *Goldman Sachs of crypto*.

Another favoured "social bank" is **Square**. On Aug 1st, Square joined the BNPL (Buy Now Pay Later) party with the $29b acquisition of AfterPay. We see BNPL as the future of credit for Gen Z consumers who make up most of their 80m+ users; we thus see a perfect fit for their mix of CashApp and POS users. Merger arbitrage pressure on the stock is likely to keep it flat until the deal closes in 1Q22. The Q3 e-commerce slowdown has hurt Amazon, Shopify and others: we have reduced our position in **PayPal.**

DF owns some direct and indirect exposure to Crypto markets:

- ***VanEck Bitcoin ETN, Square, Coinbase, PayPal, Equonex***
- ***Amazon/AWS*** and ***Microsoft/Azure*** are also, paradoxically, sellers of crypto blockchain runtime capacity
- Watch list : ***Silvergate Capital, Signature Bank***
- Private company watch list : ***Kraken, Binance, FTX***

Visible Tech: eCommerce & Apps

e-Commerce is normalising from very high growth rates, but is also getting hit with the supply chain mess. The Covid helicopter money was bound to run out. Amazon's distribution center capex surged +80% on a trailing 12 months runrate, 2x its sales growth. They aim to circumvent Fedex, UPS and global post office systems. They will soon reach 2x more distribution center capacity than Walmart (US only), with 45% fewer employees thanks to intense automation. Europe is next. Singapore's Shopee (Sea Ltd) raised $6b in September to build distribution centers in Europe and Latam, everyone is doing it. We see it in start-ups and in mega caps, short cycle consumer supply chains, a surge in onshoring, additive manufacturing (3D printing) and robotics will tackle supply chain crisis.

To address both the supply chain and the energy crisis, we think the time for on-shoring and robotics is now. Politics and technology are ripe to accelerate the 4th industrial revolution, boosting the prospects for additive manufacturing (3D printing), machine floor robotics, IoT, and supply chain software, a long ignored segment of SaaS investors. We own **Stratasys**, world leader in 3D printing for polymers, as well as **Kinaxis**, a niche player in supply chain software.

DF attempts to own digital app companies that have the ambition, the product and the ability to become super apps, possibly new mega-tech companies. Among them we list **Square, Paypal, Uber, Airbnb** and **Zillow.** Zillow however, was replaced by **Opendoor** as they seem to be breaking away from the pack in iBuying (robotic buying and selling of residential homes); **Airbnb** is temporarily off the list as we reduced consumer cyclical exposure in favour of Clean Tech. **HelloFresh** also has super-app potential; the stock has been weak due to worries about food cost inflation and the return of eating out, but we think they are the best in class play on home delivery for the entire grocery and fresh food value chain. We recently added **Ubisoft** after their earnings release on the back of a stabilisation in the outlook and a strategic shift to NFT/metaverse gaming.

DF owns a combination of eCommerce, TaaS, eLogistics and eProperty plays as well as several integrated marketplace/fintech enablers, to capture some of the largest TAMs. Subscription and advertising based New Media also features here.

- ***PayPal, Square, Snap, Amazon, Uber, Adyen, Adobe, Opendoor, HelloFresh, Kahoot! Alphabet, Ubisoft***
- Watch list : ***Shopify, Zalando, Teladoc, Veeva, Mercadolibre, Sea Ltd, Ocado, Alibaba/Ant, StoneCo, Zillow, Redfin, Delivery Hero, Just Eat Takeaway, Zur Rose Group, Jumia, Netflix, Trade Desk, CD Projekt, Paradox, Roku, Stillfront, nCino, Lemonade, Sprout Social, Amwell, Zoom Video, Chegg, Anaplan, Paycom, Asana, Pinterest, Lightspeed Commerce.***
- Private company watch***: Hinge Health, Prose, NA-KD, Ollie, JobandTalent, Rex Home***

Clean Tech & Mobility

As discussed earlier we are invested in electrification technologies, across Electric Vehicles, Grid dispatching software, electricity inverters and battery storage tech.

Alongside **Tesla**, we own Chinese EV leader **Nio**, uniquely innovative with their Battery-as-a-Service, offering car owners a membership service for battery replacement, not only for fast charging but for future upgrades as battery tech evolves. We also aim to own **Polestar**, the performance EV brand co-owned by Geely and Volvo Cars; they are on course for a merger with the Gores Guggenheim SPAC. **Alfen** is the leading charging station owner and operator in Benelux, with service starting in Germany and France.

They also operate an electricity load balancing software service, similar to their US counterpart **Stem** which we own as well. **Enphase** is a world leading manufacturer of electric current inverters critical to the charging and discharging of stationary batteries; they also sell complete home battery systems, competing successfully with Tesla's Powerwall; they recently reported re-accelerating growth.

Environmental sustainability remains a dominant narrative for consumer products and brands. One of the fastest ways to impact this transition is sustainable packaging. **We remain investors in** French chemical engineering **Carbios** who have developed an enzymatic biodegration of several plastic polymer chains, notably PLA and PET. Carbios recently inaugurtated its first demonstrator plant capable of processing 40,000 liters of polymers for mega brands to test volume production. As a reminder, l'Oréal's Biotherm brand recently announced the launch of the « bottle of the future ». The two brands have created a bottle (« Waterlover ») made of from 100% bio-recycled plastic produced through Carbios' unique enzymatic bio-recycling process. Biotherm anticipates mass production of bottles in 2025. DF participated in an equity raise for Carbios in May.

DF owns EV, Hydrogen and Clean Tech companies:

- ***Tesla, NIO Inc., Polestar (Gores Guggenheim SPAC), Alfen, Stem Energy, Plug Power, Carbios, Ceres Power, Enphase Energy, Joby Aviation***
- Watch list: ***Solar Edge, Sunrun, Sunnova, First Solar, ReneSola, Ballard Power, Fuel Cell Energy, Bloom Energy, Doosan Fuel Cell, ITM Power, CATL, Blink Charging, ChargePoint, Volta, X-Pheng, Li Auto, STMicro, Wolfspeed, Valeo, Fisker, Lucid Motors, Rivian, Volvo, Volkswagen, Geely, LG Chem, Electrovaya, Archer Aviation, eHang.***

Life Sciences and Gene Medicine

Since inception, we have been investors and supporters of the **CRISPR Cas9 revolution in gene editing.** On Oct 12, **Allogene Therapeutics** (not held in DF) announced that the FDA had placed a clinical hold all of its allogeneic CAR-T programs, following the finding of chromosomal abnormality in one patient treated with ALLO-501A. Although information is limited, it is possible that the abnormality may have been caused by "chromosomal translocation" during multiplex gene editing (i.e. off-target gene editing). The impact was quite negative across the entire gene editing space. Most likely this is related to drug production and quality control. Indeed, while gene editing has so far shown high efficacy, the manufacturing of allogenic CAR-Ts is a challenge as it scales up. We expect the FDA to set a high bar.

On Oct 13, new lymphoma results from rival **CRISPR Therapeutics** (held in DF) also had an intriguing detail on chromosomal alterations. CRISPR said up to 1% of a patient's cells have a translocation at editing sites. The FDA has placed no hold on **CRISPR** Therapeutics' program. The stock however, is 50% below its Feb highs. The gene editing space in general has been under pressure since. Still, according to our interviews with external experts, the risk of off-target translocation could be minimized by targeting a single location or by sequential editing, and with adequate quality control and drug product release testing. Time and money, but manageable.

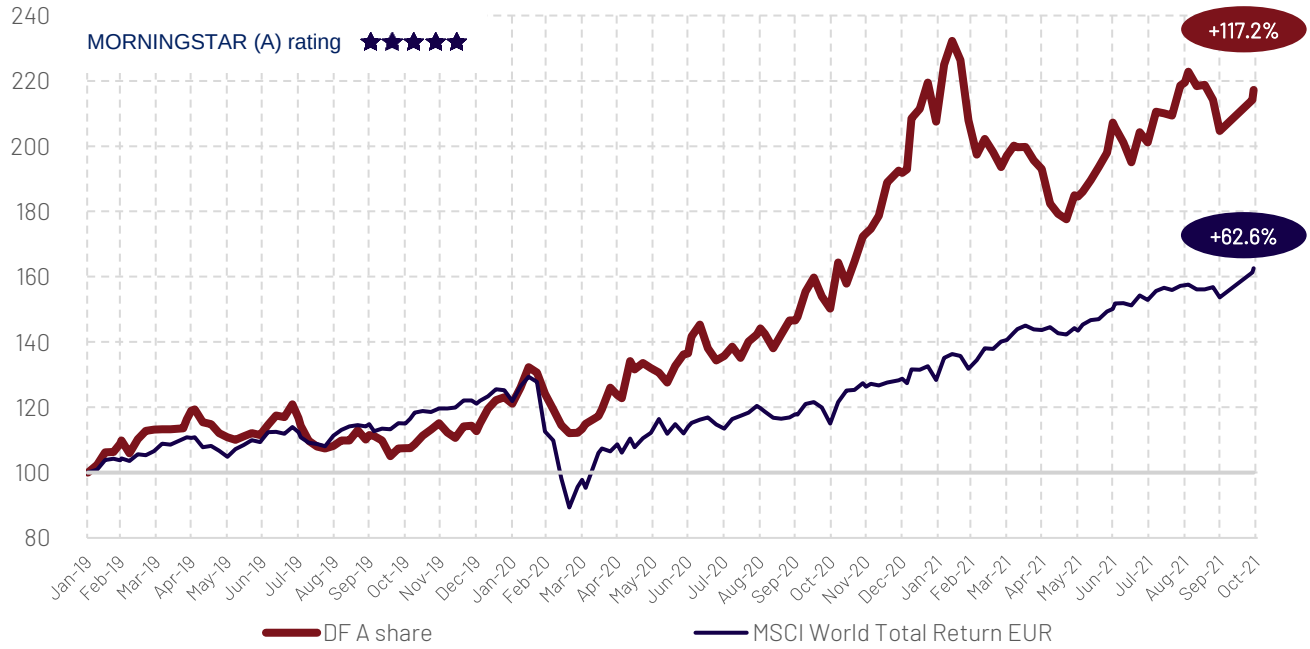
Finally, we are also investors in the emerging field of **protein degrader** technology as well as **microbiome-based** therapies. **Evelo Biosciences** (held in DF) recently reported a highly efficacious Phase 2 in psoriasis but had some confusingly good responders on placebo. The trial design for Phase 3 will need to be updated, perhaps with a slight change to formulation and/or dosing. More results in Atopic Dermatitis are expected in 1H22.

DF owns CRISPR and AI driven molecular research companies:

- ***CRISPR Therapeutics, Intellia, Caribou Bio, Graphite, Evelo Bio, Arvinas***
- Watch list: ***Iovance, Illumina, Pacific Bio, 10X Genomics, ToolGen, Cellectis, Thermo Fisher, Personalis, Exact Sciences, Cerus, Adaptive Bio, Natera, Accelerate Diagnostics, T2 Bio, Exagen, Beam, BiomX, Kaleido, Synlogix, Seres, C4 Therapeutics, Invitae***
- Private company watch: ***Casebia Therapeutics***

Disruption Fund Performance

	YTD 29/10/21	Since 31/01/19
Disruption Fund (A share)	**+13.2%**	**+117.2%**
MSCI World Total Return EUR	**+26.3%**	**+ 62.6%**



Note: Data range = 31/01/2019 → 29/10/2021. Jan 31, 2019 marks the start of the new fund management team, including name change and new prospectus. Past performance is not indicative of future returns. Please consult your investment advisor for suitability. NAV performance shown here is for A-shares, net of fees.

As of Oct 29, 2021, the top equity positions of the Disruption Fund were as follows:

•	*ASML Holding NV*	*3.26%*	
•	*Alphabet inc*	*3.20%*	
•	*NIO Inc*	*3.19%*	
•	*Enphase Energy Inc*	*3.13%*	
•	*NVIDIA Corp*	*3.12%*	
•	*Advanced Micro Devices*	*3.11%*	
•	*Niu Technologies Inc*	*3.11%*	
•	*Coinbase Global Inc*	*3.10%*	
•	*Zscaler Inc*	*3.01%*	
•	*Palo Alto Networks Inc*	*2.86%*	
•	*Alfen Beheer NV*	*2.75%*	
•	*VanEck Ethereum*	*2.63%*	
•	*Square Inc*	*2.61%*	
•	*Wise plc*	*2.56%*	
•	*Stem Inc*	*2.56%*	
•	*Plug Power Inc*	*2.48%*	
•	*Tesla Inc*	*2.40%*	
•	*HelloFresh SE*	*2.29%*	
•	*Uber Technologies Inc*	*2.25%*	
•	*Kinaxis Inc*	*2.18%*	
•	*Adobe Inc*	*2.07%*	
•	*Stratasys Ltd*	*2.04%*	
•	*SOITEC SA*	*2.02%*	
•	*Ubisoft Entertainment*	*1.99%*	
•	*Adyen NV*	*1.97%*	
•	*Opendoor Tech Inc*	*1.92%*	
•	*VanEck Bitcoin ETN*	*1.87%*	
•	*Amazon.com Inc*	*1.84%*	
•	*Polestar (GGPI SPAC)*	*1.83%*	
•	*Microsoft Corp*	*1.61%*	
•	*Evelo Biosciences Inc*	*1.53%*	
•	*CRISPR Therapeutics AG*	*1.48%*	
•	*Intellia Therapeutics Inc*	*1.44%*	
•	*Carbios SACA*	*1.37%*	
•	*Paypal Holdings Inc*	*1.31%*	
•	*Snap Inc*	*1.14%*	
•	*Graphite Bio Inc*	*1.10%*	
•	*Ceres Power Holdings Plc*	*1.09%*	
•	*Kahoot! AS*	*1.01%*	
•	*Caribou Biosciences Inc*	*0.95%*	
•	*Arvinas Inc*	*0.93%*	
•	*Diginex Ltd*	*0.76%*	
•	*Believe SAS*	*0.67%*	
•	*Joby Aviation Inc*	*0.66%*	
•	*Nanobiotix SA*	*0.28%*	

We hope you find our letter useful and look forward to continuing this discussion.

Jean-Edwin Rhea – 31 Oct 2021

Legal Information:

Disruption Fund is a French UCITS, (A share: FR0012770154 / B share: FR0012770162) invested primarily in global equities, with a recommended holding period of 5 years. Broadly speaking, the Fund seeks to invest in innovative technology businesses. More specifically, the fund seeks out sectors and companies undergoing structural or technological disruption. The fund manager seeks leading disruptive companies, growing fast, with visionary management teams. All historical data provided is for A-shares, currently closed to new investors.

This information letter is not contractually binding, and the formulated assessments reflect our opinion on the publication date and consequently are likely to be revised later. Reference to certain securities and financial instruments is for illustrative purposes to highlight stocks that are or have been included in the portfolios of Disruption Fund. This is not intended to promote direct investment in those instruments and does not constitute investment advice nor an offer to invest or subscribe in any asset or funds. The portfolio of Disruption Fund may change without prior notice. Past performance is not a reliable indicator of future performance. Performances are net of fees where applicable. Investors may lose some or all of their capital, as the capital in Disruption Fund is not guaranteed.

The MSCI World Net Total Return Euro Index (Bloomberg : MSDEWIN) is calculated net dividends reinvested and is published by MSCI.