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The Green Transition's Dirty Little Secrets

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Energy consumption by source, World

100% Other renewables Biofuels Solar Wind Hydropower Nuclear 80% Gas 60% Coal 40% 20% Oil 0% 1970 1980 1990 2010 1965 2000 2022

Measured in terms of primary energy using the substitution method

Source: Our World in Data

Our World in Data

IEA's Proposed glide path to net zero



Vast amounts of capital has been flowing into the green transition



China have been winning an outsized share of this spend



China's power demand has rapidly increased

No Longer Developing

China consumes more electricity per person than the European Union



 Despite its developing nation status, China's power consumption on a per capita basis is now on a par with many developed nations

Source: Statistical Review of World Energy, China Electricity Council Note: 2024 data based on CEC's projected electricity demand growth rate. Figures in megawalt-hours per year.

Bloomberg Opinion

Energy intensity highly correlated to wealth

Energy use per person vs GDP per capita, 2021



Energy refers to primary energy, measured in kilowatt-hours per person, using the substitution method. Gross domestic product (GDP) is adjusted for inflation and differences in the cost of living between countries.



Power generation in China is very reliant on fossil fuels

- China's power grid has a high reliance on coal-fired power generation
- China continues to expand their coal fired power station fleet while the rest of the world is aggressively transitioning away from coal.

A Habit That's Hard to Kick

Coal is still supplying most of China's electricity demand growth



Mining & Basic Material Production in China is very power intensive



Renewables are linked to higher power tariffs in developed countries



Europe's has a declining share of global economy

• German Finance Minister Christian Lindner, "We are no longer competitive. We are getting poorer because we have no growth. We are falling behind".



Net Zero targets are inflationary & require taxpayer funding of incentives

The German boss of Britain's biggest wind turbine maker has warned energy bills will have to keep rising to pay for the green transition as he attacked "fairytale" thinking about **net zero.**



Energy bills must rise to pay for net zero, says Siemens Energy boss

Transportation is another 'needle mover' for the green transition

TAX

SCHOOL BUS

TAXI

Battery Electric Vehicles (BEVs) penetration has lifted materially



BEVs, PHEV's & Fuel Cell drive trains are clear emission winners in developed markets





Source: Total CO2-equivalent life-cycle emissions from commercially available passenger cars - Johannes Buberger, Anton Kersten, Manuel Kuder, Richard Eckerle, Thomas Weyh, Torbjörn Thiringer

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EV CO2 Life cycle emissions are very dependent on the country grid mix



- **BEV 1 (Battery Electric Vehicle 1) = production and driving in Bulgaria**
 - Grid mix: RE = 17%, Coal = 49% , NG = 1%, Nuclear = 33%
- **BEV 2 (Battery Electric Vehicle 2) = production and driving in EU 28**
 - Grid mix: RE = 26%, Coal = 19%, NG = 14%, Nuclear = 29%, Oil = 10%
 - **BEV 3 (Battery Electric Vehicle 3) = production and driving in Norway**
 - Grid mix: RE = 98.6%, Coal = 1.4%
 - **BEV 4 (Battery Electric Vehicle 4) = production and driving in Poland**
 - Grid mix: RE = 13%, Coal = 80% , NG = 5.5%, , Oil = 1.4%
 - **CV (Combustion Vehicle) = Production and driving in Bulgaria**

EV's competitiveness hugely dependent on government subsidies



Source: Overcharged Expectations: Unmasking the True Costs of Electric Vehicles, Brent Bennett and Jason Isaac

BEV adoption rates vary per region



BEV adoption rates highly correlated to Government subsidies



BEV adoption rates are stuttering of late



China auto production (Passenger + commercial vehicles) 000s

The Telegraph News Sport Health Money Business Opinion Israel Ukraine Royals Life & Style Travel Culture

Electric cars losing their value twice as fast as petrol alternatives

Early adopters have seen huge amounts wiped off the value of their purchases



Hertz Begins Dumping 20,000 EVs In Shift Back To Petrol Cars

Taxpayer-Funded Electric Busses Are Sitting Broken Down And Idled Across The Country

Ford is cutting planned production of its electric F-150 in half for 2024, after losing \$60,000 per electric vehicle sold.

EV deflation is a headwind to widespread adoption



Mining Companies often bear the brunt of ESG driven exclusions

The Green Transition is very metal / mining intensive

New supply chains will need to quadruple in less than 20 years to be on track for net zero: it is very unlikely that supply can increase quickly enough



Green metal greenfields project lead times are significant

Range of typical lead times to initial production for selected steps in EV battery supply chain



Source: IEA analysis based on Heijlen et al (2021), Benchmark Mineral Intelligence, S&P Global; Lead times for mines are from prefeasibility study to the start of production. For other elements, lead times are from investment decision to production

The Green Transition will be very metals intensive

THE VOLUME OF 2050 NET-ZERO **COPPER DEMAND** Reaching net-zero emissions by 2050 demands volumes of copper humanity has never produced before, to be used in electronics, wind and solar installations. nuclear facilities and more. 1.4 billion tonnes 700 million tonnes Total copper produced over New copper needed to reach net zero by 2050 the course of human history Over the next 27 years, the world will demand nearly twice the volumes of copper the world has produced over the last 3000 years.

To meet net-zero targets, estimates are that the world needs approximately **1,4 billion tons of new copper supply by 2050** (700m tons are required in the next 22 years alone)

• This is 2 x all the copper mined over the last 3,000 years



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Sasolburg South Africa

Sasol and carbon tax





- Sasol is the second-highest emitter of carbon dioxide in SA (behind only Eskom)
- National Treasury has proposed carbon tax rates up to 2030, along with large tax-free allowances as a phase-in mechanism.
- Sasol receives a ~85% tax-free allowance until 2025, beyond which is unclear, except that Treasury plans to gradually phase them out
- Impact on Sasol's Southern African business is small for now, but we forecast it growing significantly over time

Sasol and carbon tax: the trade-offs

Economic benefits at risk:

- R190bn revenue generated in Southern Africa or c 2.5% GDP
- >20k direct employees based in SA
 - Secunda population: 40k + Sasolburg population: 31k
- R584mn spent on social investment in SA (education, skills development, sponsorships, community development)

Industries impacted:

- Key source of liquid fuels for inland SA Transnet pipeline infrastructure will be strained if refined fuel imports to Gauteng increase to compensate
- Only industrial-scale manufacturer of ammonia for fertiliser & explosives in SA
- Only industrial-scale manufacturer of plastic precursors in SA
- · Several other chemicals would need to be imported









ESG momentum appears to be fading – Cyclical or Structural?



- Flows into ESG products and ESG product investment performance has moderated over the last year
- Difficult to untangle whether this is cyclical or structural ?
- No doubt that higher interest rates have had an impact on longer duration / growth assets

Anti-ESG momentum is building at the polls



ESG pragmatism is slowly replacing ESG idealism

I'm announcing today that we're going to ease the transition to electric vehicles. You'll still be able to buy petrol and diesel cars and vans until 2035.

Rishi Sunak, *PM speech on Net Zero*, 20 September 2023

The New York Times

https://www.nytimes.com/2024/02/17/climate/biden-epa-autoemissions.html

Biden Administration Is Said to Slow Early Stage of Shift to Electric Cars

Positive ESG momentum at company level is key

- Current ESG challenges are not an excuse to abandon ESG initiatives & asset managers have a crucial role to play in driving positive ESG momentum in our underlying investments
- Global ESG policy makers need to do better at considering economic and real-world realties or we will run a real risk of losing broad public support
- Future ESG solutions are likely to more pragmatic across several cleaner technologies (BEV, PHEV, Solar, Wind, LNG, Nuclear)





Thank you.

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