

8 billion reasons why capital investment matters again



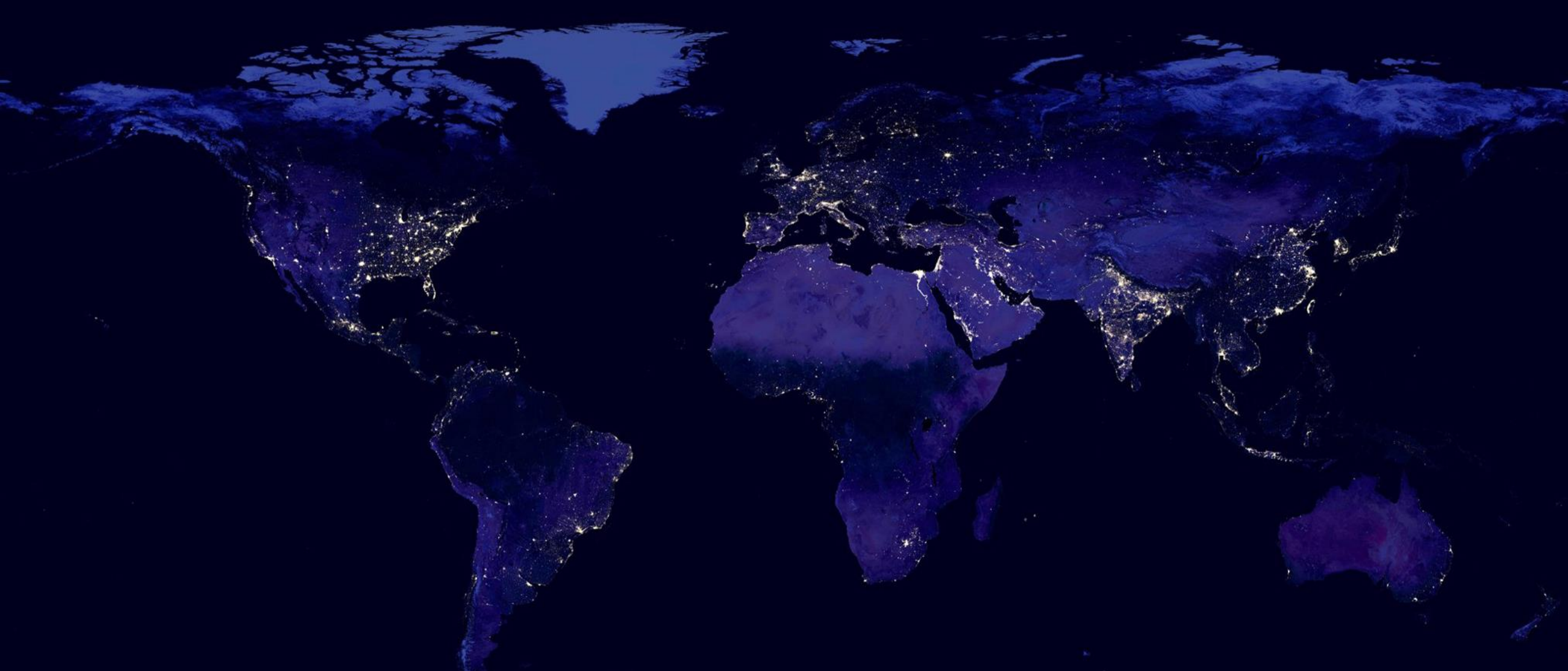
MACKENZIE
Investments

That's better together

John Cook, CIM

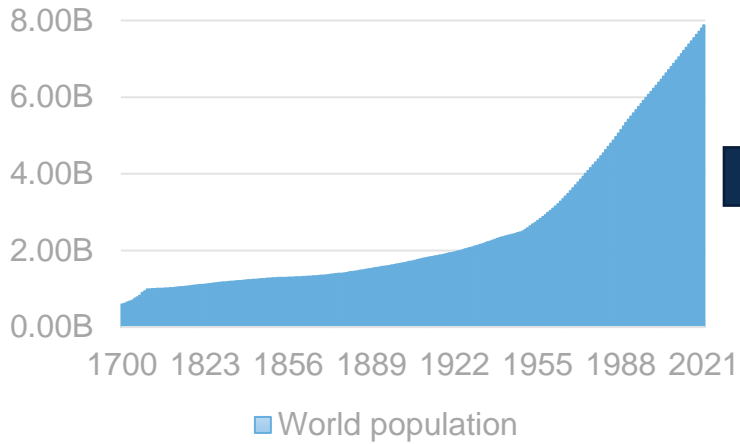
Senior Vice President and Portfolio Manager
Team Co-Lead, Mackenzie Greenchip Team

February 23, 2023

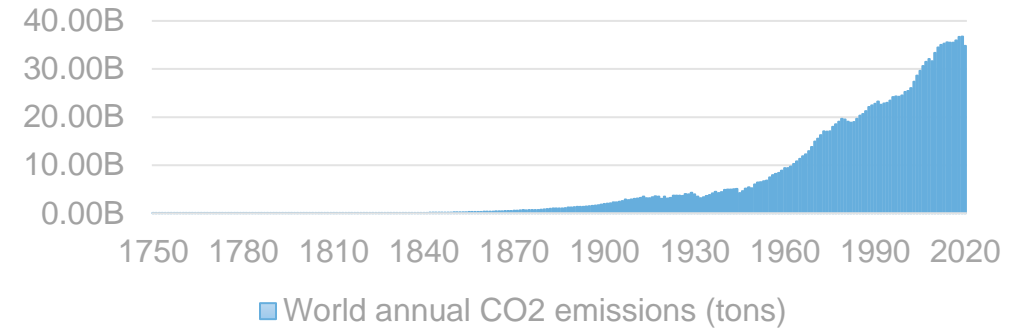


Tail Wind - Three intersecting and irrefutable forces

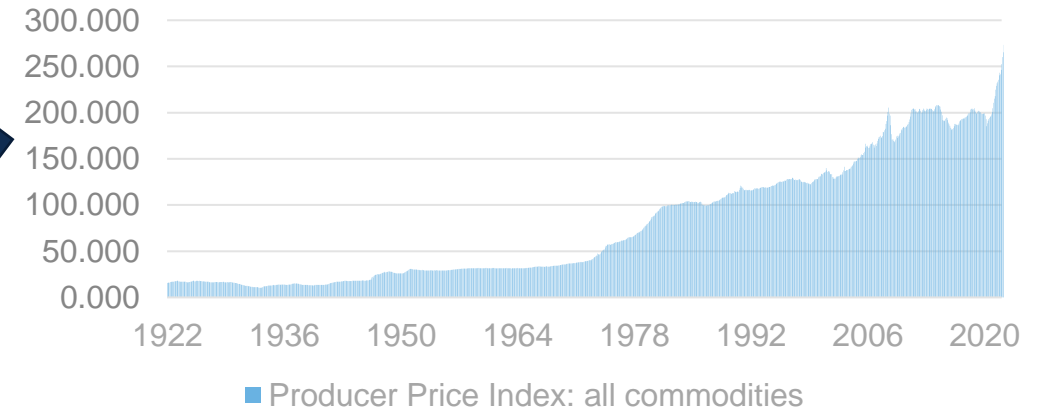
Changing demographics



Environmental stresses




Resource scarcity



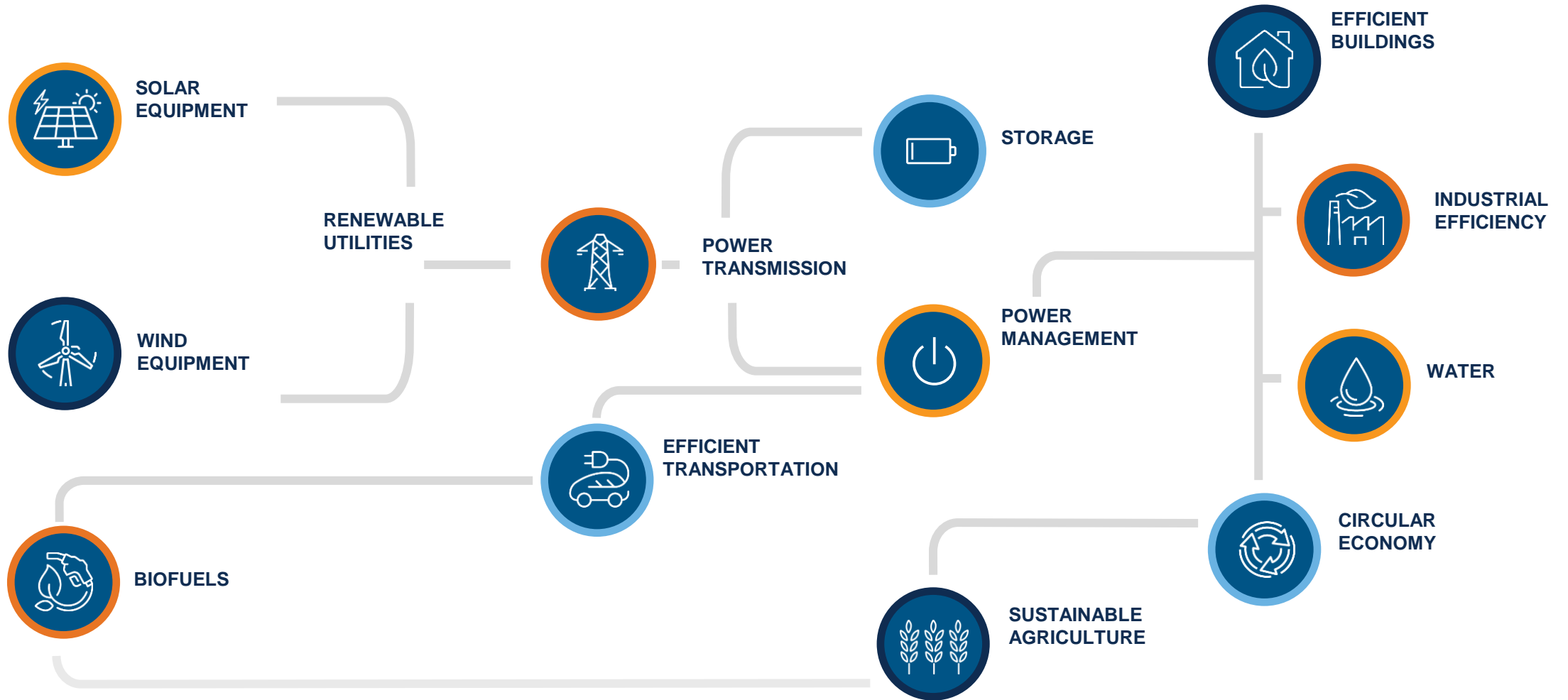
Sources: Producer Price Index from FRED - US Bureau of Labor Statistics, World population from Our World in Data - Gapminder (v6), HYDE (v3.2), UN (2019), annual CO₂ emissions from Global Carbon Project,

What is environmental thematic?

Over 1,300 companies with a cumulative \$14 trillion market cap

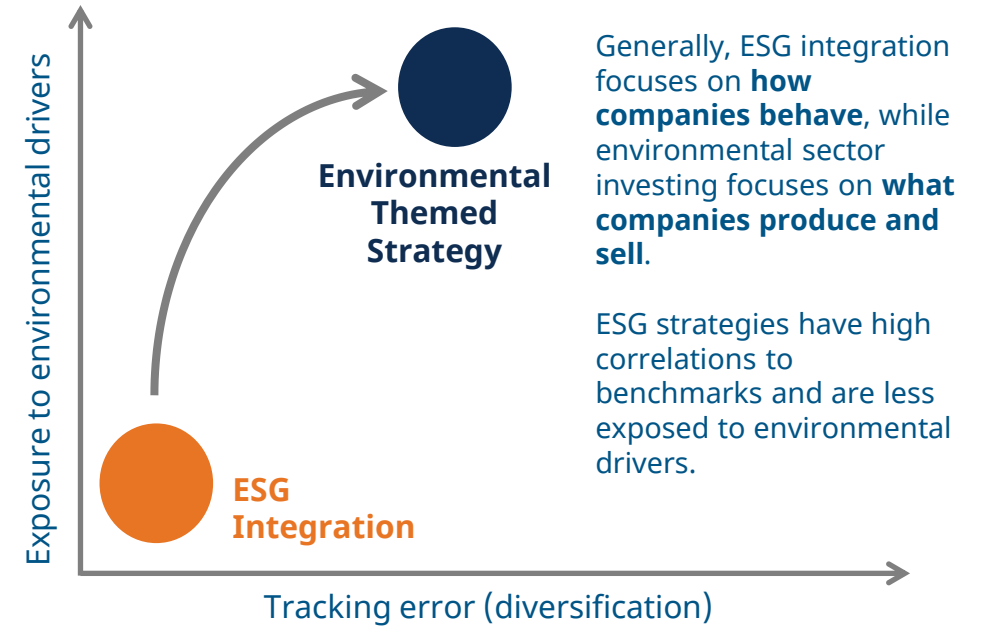
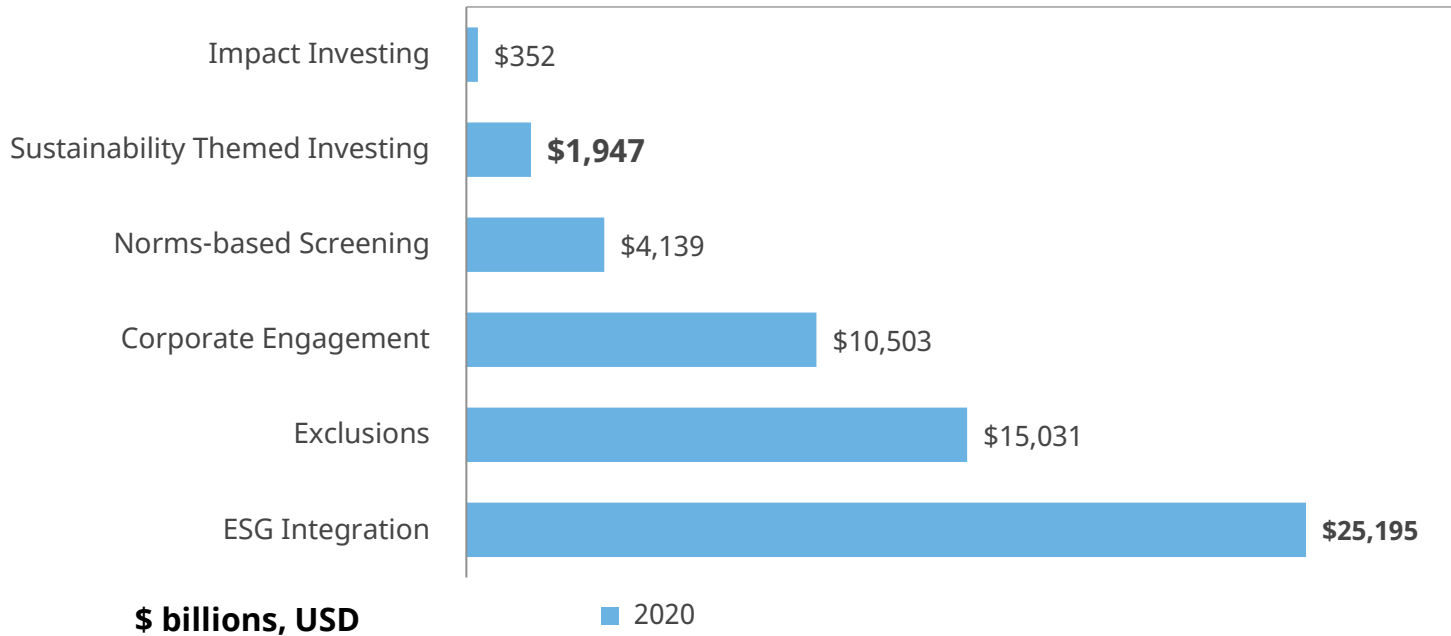
Clean Energy	Energy Efficiency	Clean up Technologies	Sustainable Agriculture	Water	Transportation
Renewable utilities	Building management and efficiency	Waste management and pollution controls	Food processing/logistics	Water utilities	Transportation operators
Renewable equipment	Lighting	Software and logistics	Agricultural inputs	Water equipment	Transportation equipment
Electric infrastructure	Engineering/ Consulting	Advanced materials	Sustainable food retail		Diversified Environmental Leaders
Energy storage equipment	Power Management	Metering and monitoring	Sustainable forestry		
Renewable fuels	Automation and drives	Industrial efficiency			

Energy transition portfolios are the pathway to reduce global emissions



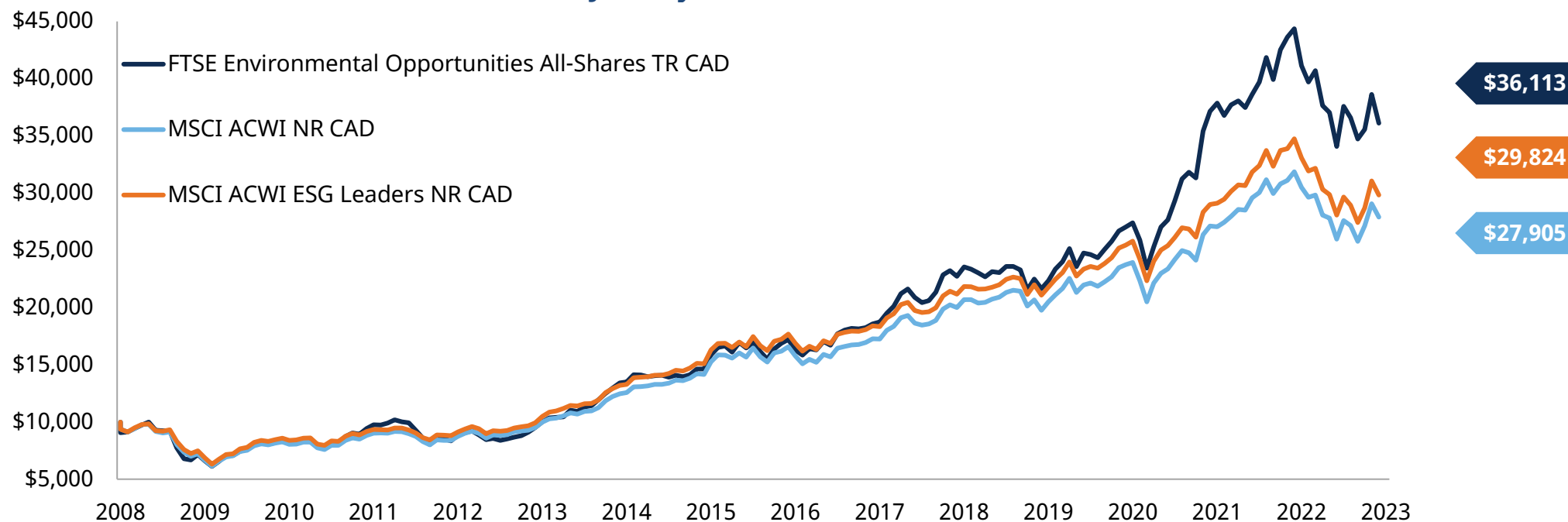
Environmental themed strategies offer better exposure to the great energy transition than most ESG strategies

Sustainable Investing Assets by Strategy, 2020



FTSE EO, ACWI and ESG AWCI

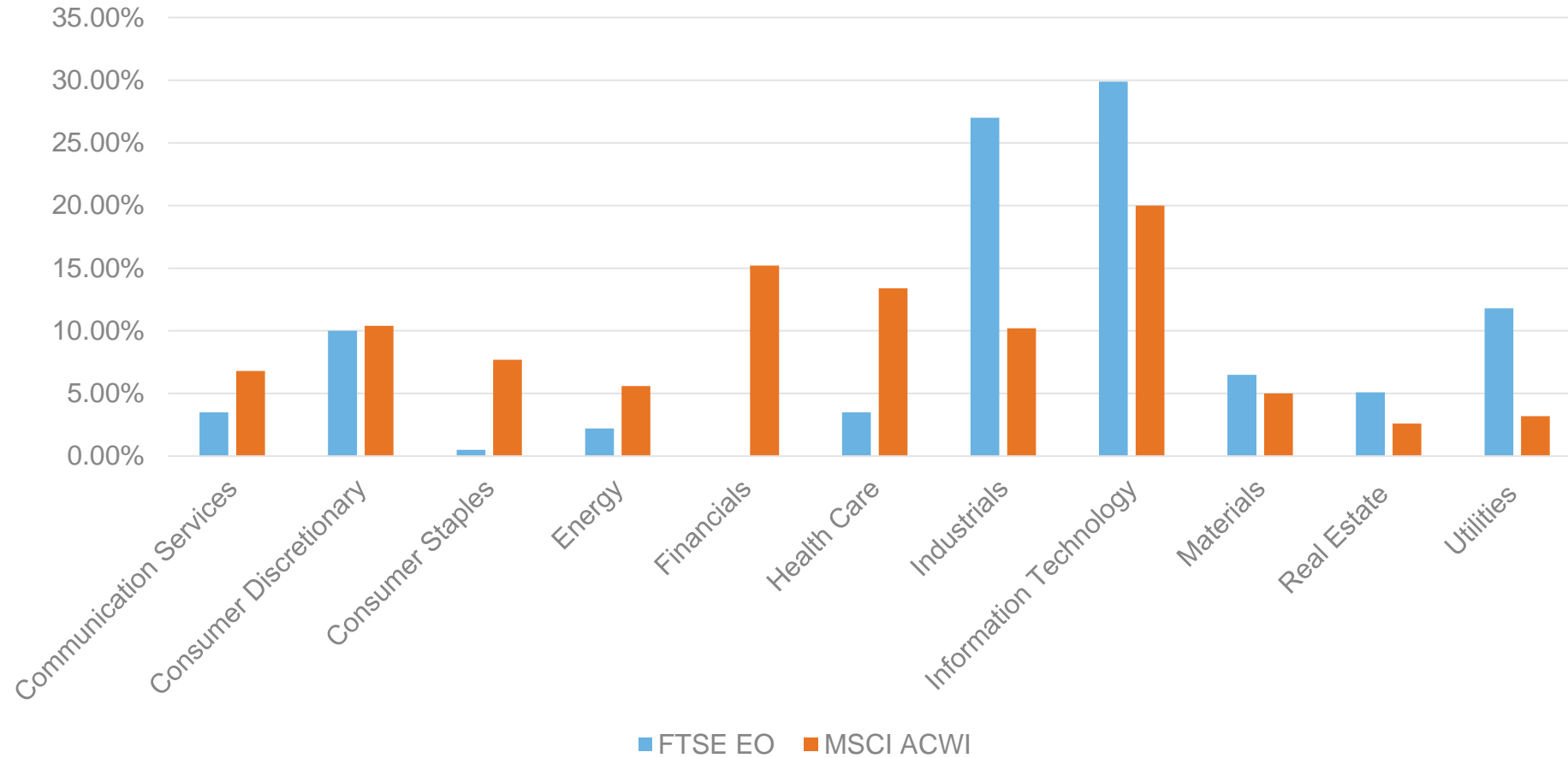
January 2, 2008 – December 31, 2022, \$CAD



	1 year	3 years	5 years	10 years	Since common inception
FTSE Environmental Opportunities All-Shares TR CAD	-18.6%	10.1%	9.7%	14.3%	8.9%
MSCI ACWI NR CAD	-12.4%	5.5%	6.9%	11.4%	7.1%
MSCI ACWI ESG Leaders NR CAD	-14.1%	5.4%	7.1%	11.6%	7.6%

Source : Morningstar Direct as of December 31, 2022. Performance in CAD

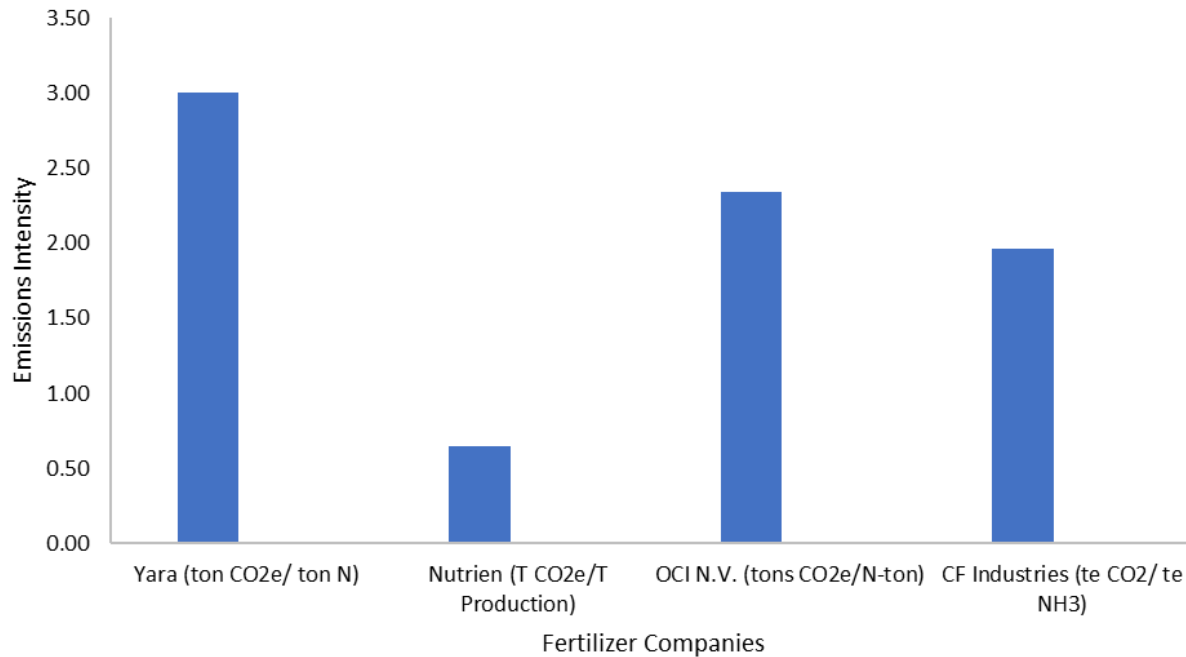
Sector Exposure – FTSE EO vs MSCI ACWI



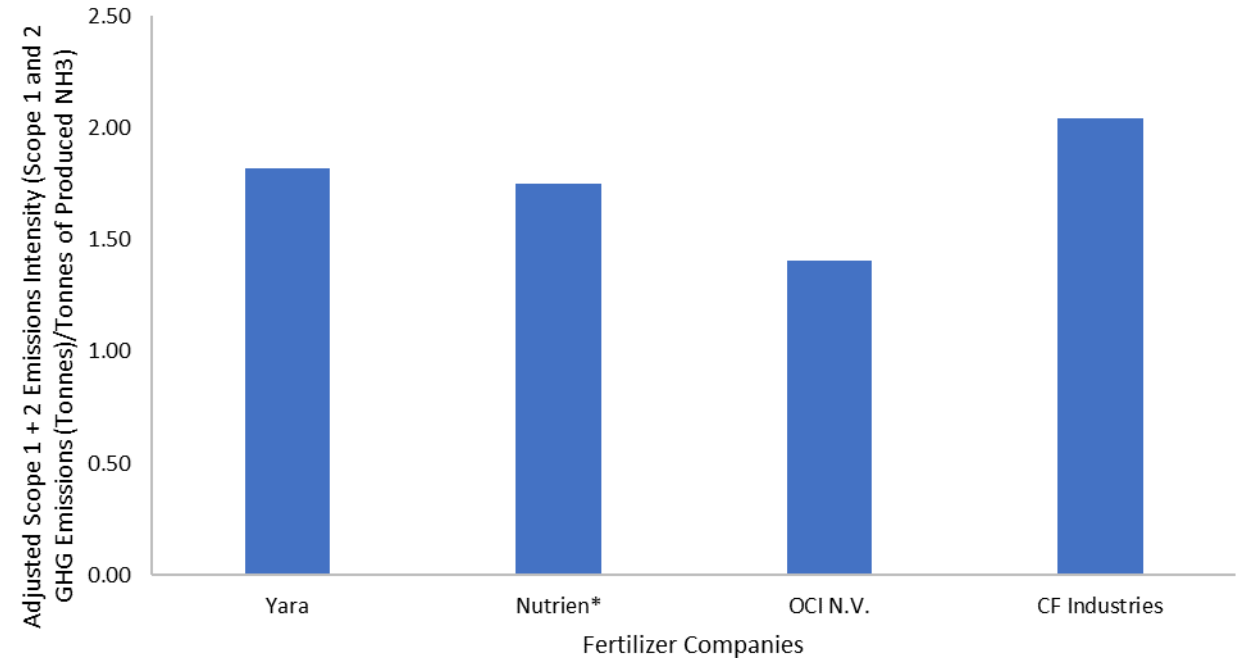
Carbon footprint screening can lead to unintended consequences

Example: fertilizer producers (publicly reported vs normalized CO₂ intensities)

Publicly Reported Emissions Intensities



Calculated Normalized Emissions Intensities



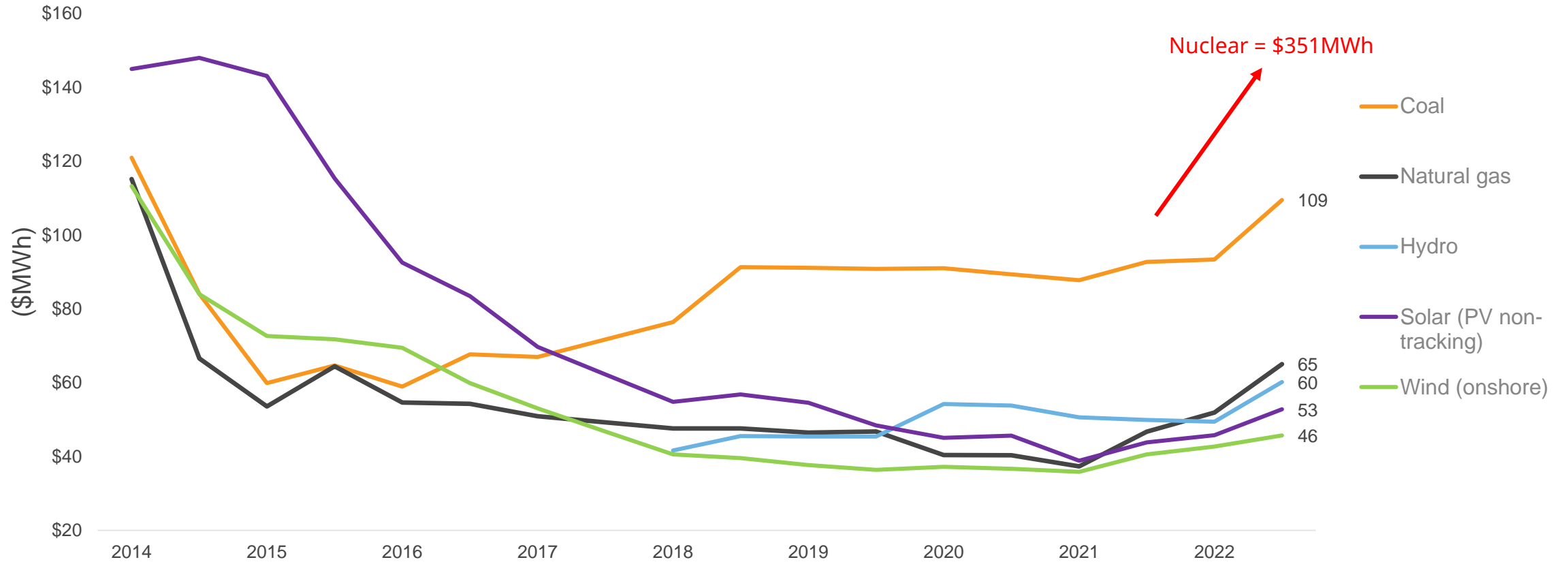
Notes: Based on Mackenzie Greenchip Team estimates. The emissions intensity for Nutrien's nitrogen production operational unit was used for comparability purposes to the major nitrogen fertilizing producing companies.

Why divestment won't work



Transformative shifts in power economics

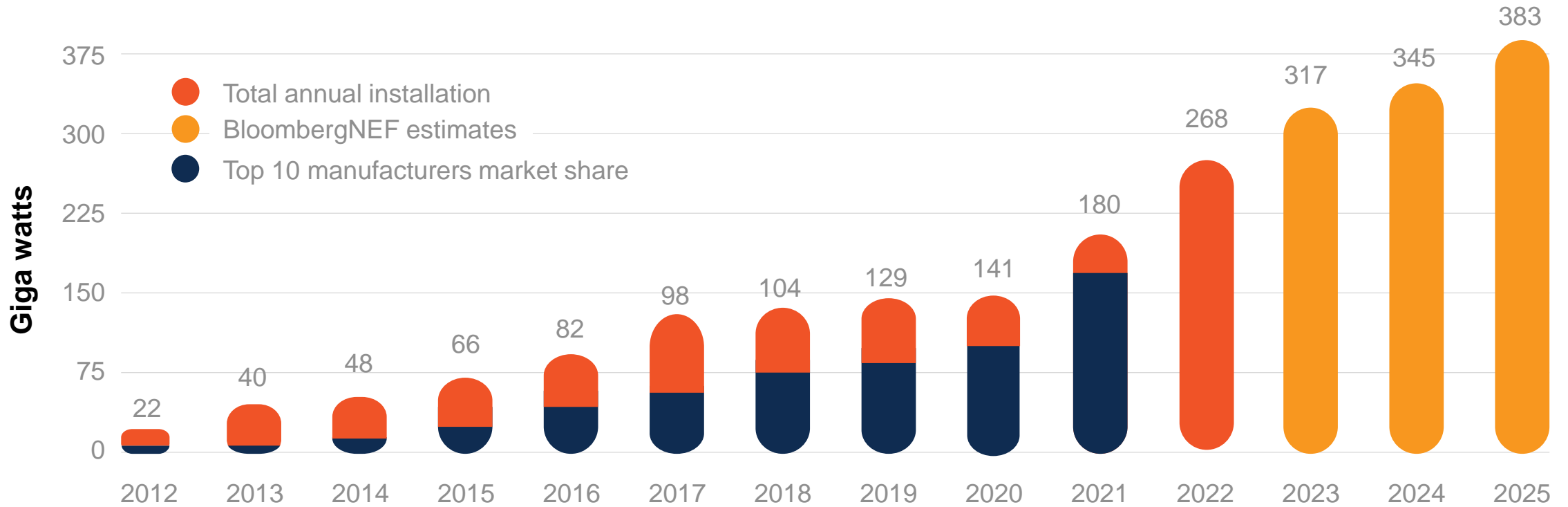
Historical Average Levelized Cost of Energy in the U.S. (Unsubsidized)



Source: Bloomberg LCOE, December 2022

Solar continues to grow, manufacturers continue to consolidate

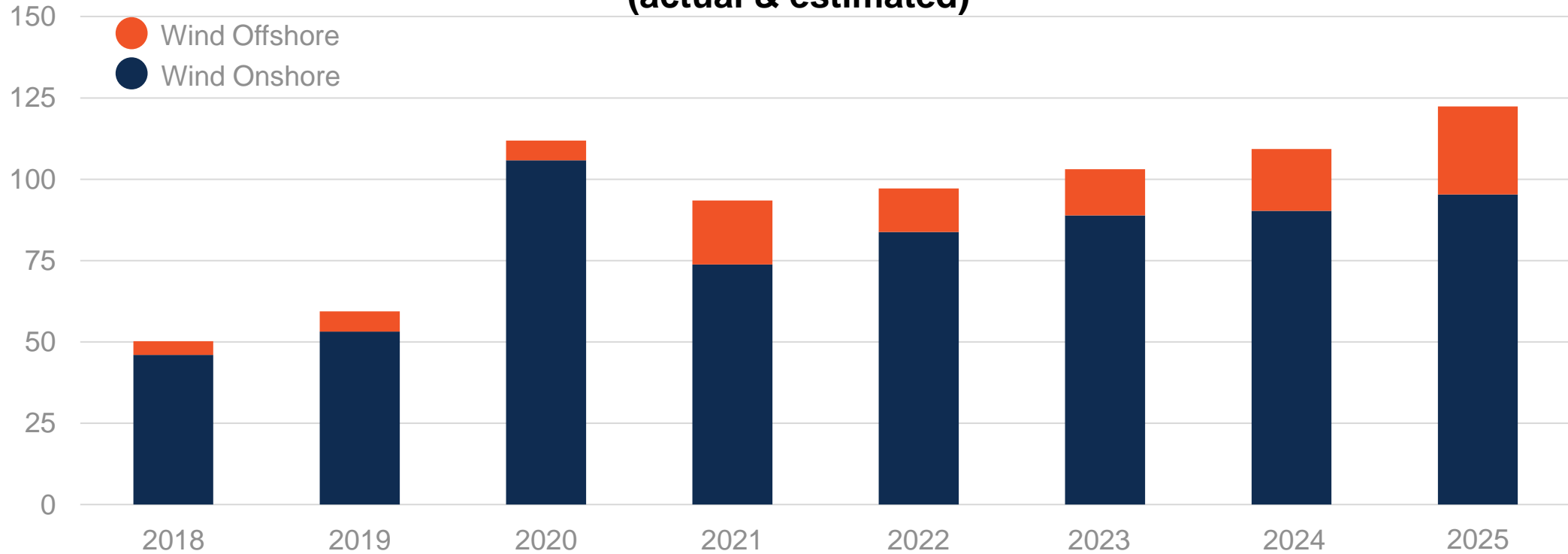
Market Share of Top 10 Module Manufacturers vs. Annual Shipments (GW)



Sources:
 Top 10 manufacturers from 2012-2020 comes from Canadian Solar reports
 Top 10 manufacturers for 2021 - <https://www.infolink-group.com/energy-article/2021-module-shipment-ranking-Longi-retains-top-spo>
 Mackenzie Greenchip estimates for 2021-2022
 Bloomberg NEF (estimates for 2023-2025)

Wind power growth stabilizing

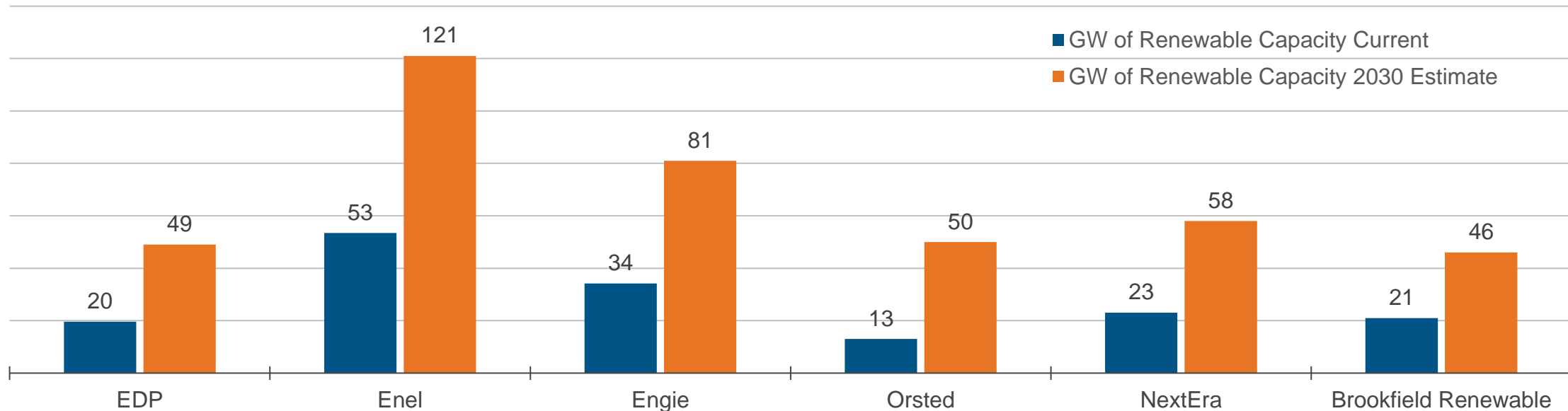
Annual global wind installations 2018 – 2025
(actual & estimated)



Source: IEA Renewables Report 2021 and 2022
Estimated figures from 2022 to 2025

Diversified power utilities offer stronger renewable development pipelines

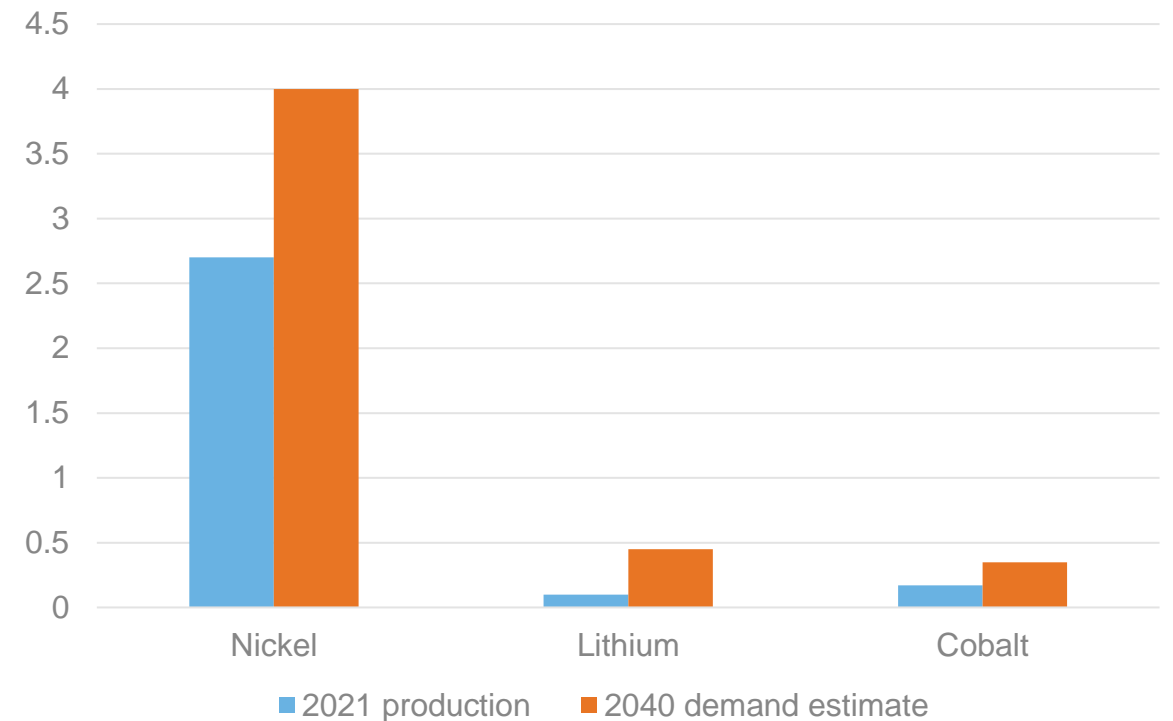
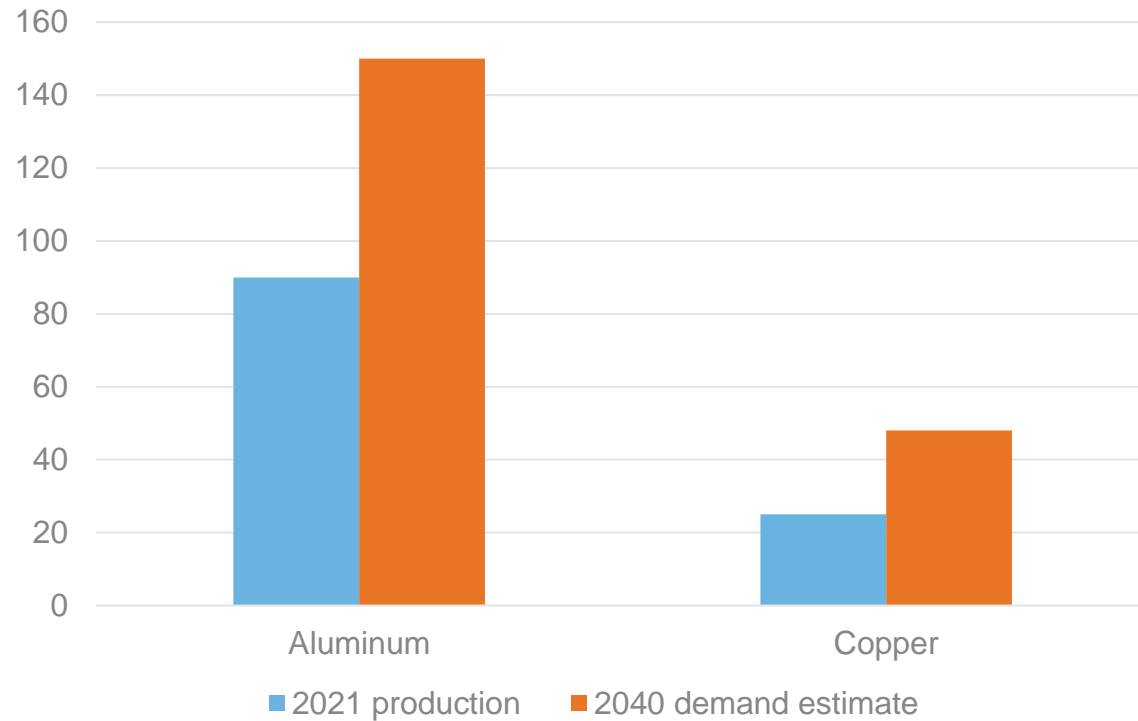
GW of renewable capacity current and 2030 estimate



Sources: Combination of Factset data (as of November 30, 2022), Annual and Sustainability Reports

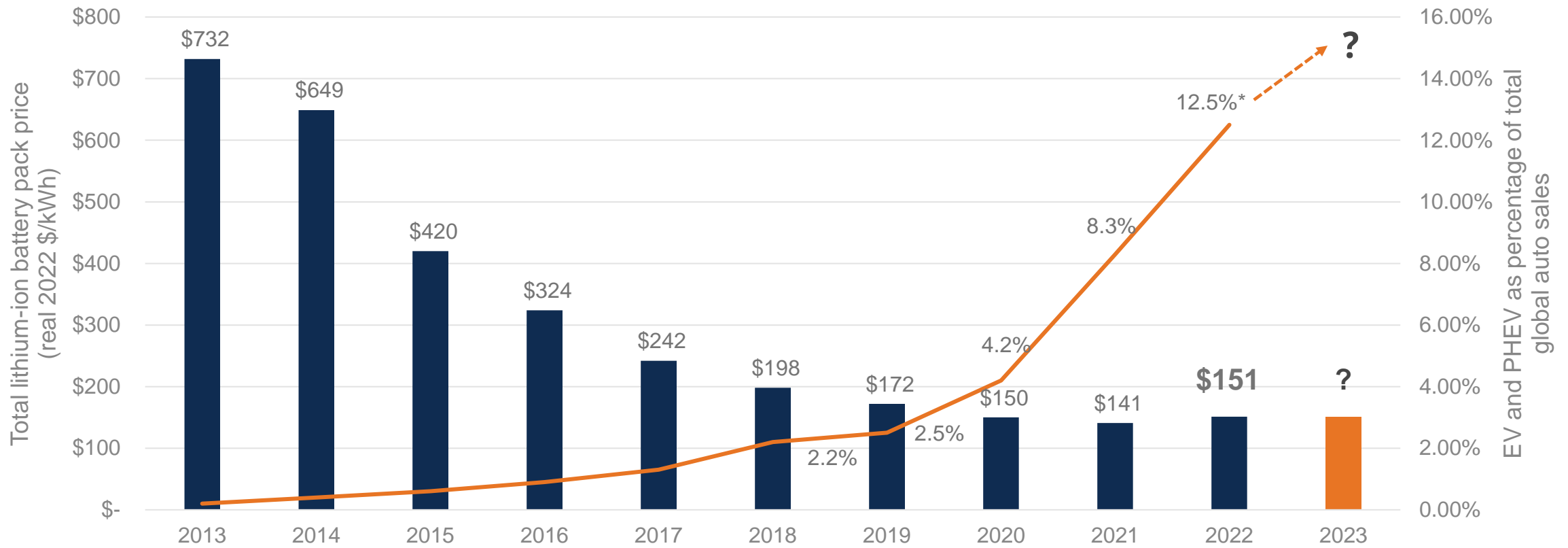
EDP : Current installed capacity FY2021 Source : [2021 Annual report](#). 2030 Capacity estimate, used 2025 targets and then assumed another 10GW of solar and wind each to be added from 2025-2030 Source: [Ambition 2030 | Goals and targets 2025 \(edp.com\)](#) Enel : Current installed capacity FY2021 Quarterly Bulletin Source: [FY2021 Quarterly Bulletin](#). 2030 Capacity estimate, assumed exit from oil at same rate as exit from gas (0 by 2040), linear rate Source: [Results presentation \(west.com\)](#) Engie : Current installed capacity Source : [Investor Fact Sheet FY 2021](#). 2030 capacity estimate Source: [PowerPoint Presentation \(engie.com\)](#) and [PowerPoint Presentation \(engie.com\)](#) Orsted : Current installed capacity: FY2021 Source: [Orsted Annual report 2021](#) Estimates made in determining electricity generation capacity from biomass, thermal power ex bio mass was assumed at a 70% gas 30% coal split. 2030 Capacity Estimate Source: [orsted-cmd-2021.ashx \(azureedge.net\)](#). Assuming fossil phase out timeline based on net zero timeline. NextEra : Current capacity FY2021 Source: Bloomberg. 2030 Capacity Estimate Source: [2021 NEE ESG Report vF.pdf \(nexteraenergy.com\)](#). Assumptions based on 2030 FPL and GP projected mix, solar targets, other assumptions, assume maintaining gas assets and phasing out coal. BEP : Current capacity FY2021 Source : [Brookfield Annual report 2021](#) Additional disclosure from BEP IR : 2030 Capacity based on current pipeline of 31GW, assuming similar mix of wind/solar as current capacity Source: <https://bep.brookfield.com/sites/bep-brookfield-ir/files/brookfield/bep/presentation/brookfield-renewable-corporate-profile-aug-2021-vF.pdf>

Aluminum, Copper, Nickel, Lithium and Cobalt are the most critical metals for electrification



Sources/Notes: All amounts in Megatonnes. For production, International Aluminium Institute, Bloomberg New Energy Finance and the International Energy Agency (IEA). For estimates, S&P Global, International Monetary Fund (IMF) and IHS Markit. The demand estimates are what the Mackenzie Greenchip team has calculated to be reasonable based on current growth trajectories.

Higher battery prices likely to effect EV adoption rates

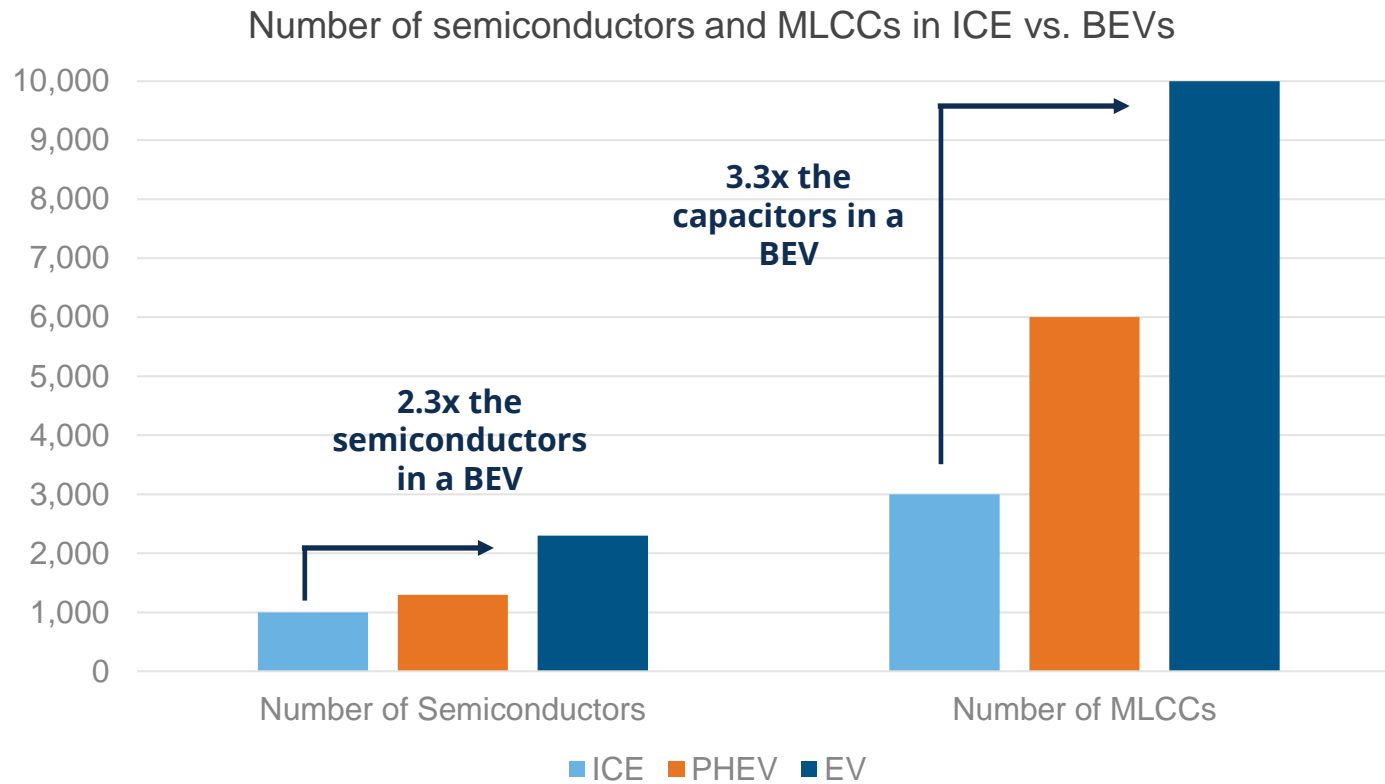


Source: Bloomberg, BNEF [Lithium-ion Battery Pack Prices Rise for First Time to an Average of \\$151/kWh | BloombergNEF \(bnef.com\)](https://www.bnef.com/news/articles/2022-11-16-lithium-ion-battery-pack-prices-rise-for-first-time-to-an-average-of-151-kwh/).

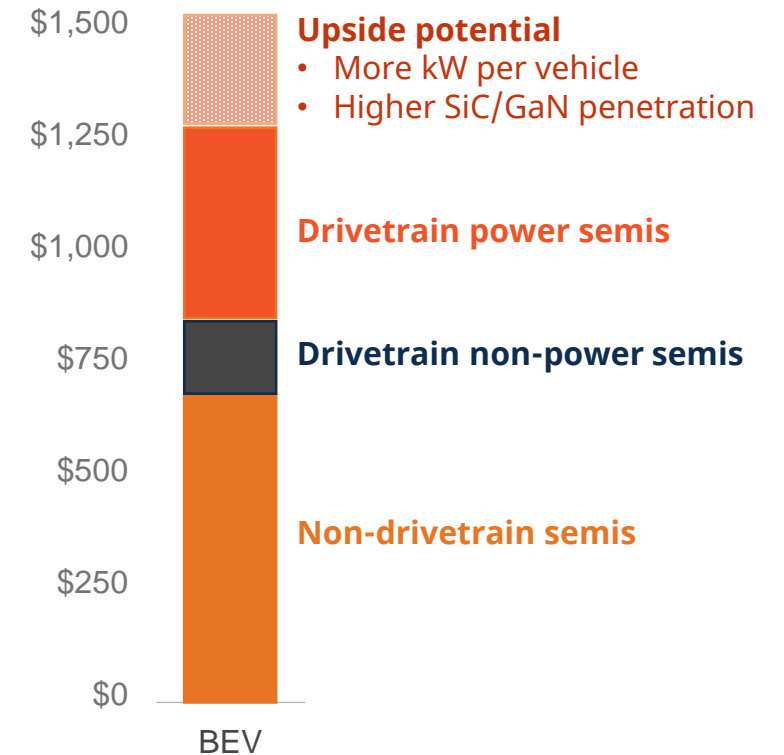
BNEF. [Automoblog The Auto Industry's Big Challenge](https://www.bnef.com/news/articles/2023-01-11-the-auto-industrys-big-challenge/), January 11, 2023.

* Mackenzie Greenchip estimate for 2022

Soaring power electronics demand

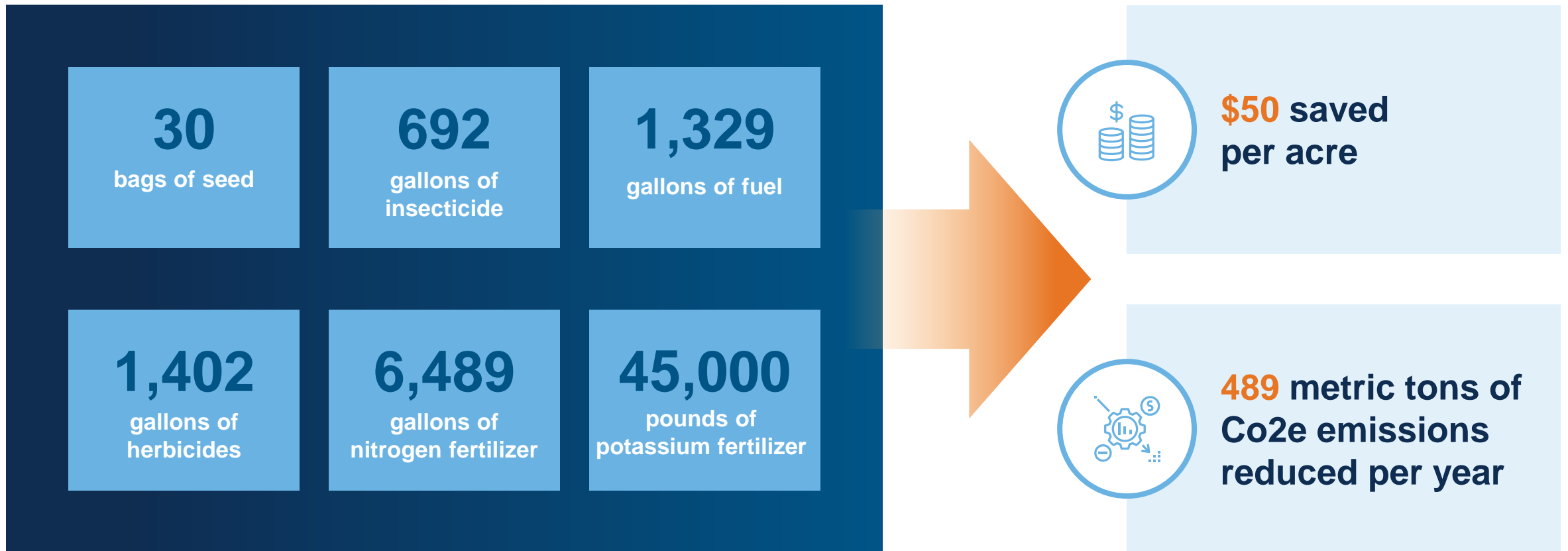


Projected semi content costs by 2027



Agricultural technologies can reduce emissions *and* improve economics

Amount of savings that are possible using a leading tractor manufacturer's top-technology on a 3,000 acre cotton farm



How does environmental thematic fit in a DC plan?

“In 2022, the global population surpassed 8 billion, resource prices reached historic levels, and global CO₂ emissions surpassed 37.5 billion tons, the most ever. Our key takeaway — the value of environmental solutions has never been greater!”

Quote from Mackenzie’s 2023 Environmental Outlook (the “Green Book”)

Appendix



MACKENZIE
Investments

That's better together

Portfolio Management Team



John A. Cook, CIM

Senior Vice-President, Portfolio Manager, Team Co-Lead

Mackenzie Greenchip Team

Investment experience since 1991

John's career in the investment industry began in 1991. He was President of Greenchip Financial Corp. since it was founded in 2007 and became part of Mackenzie Investments in 2021. Prior to Greenchip, John led corporate development at one of Canada's largest innovation hubs. He has also held a number of executive positions at Canadian mutual fund companies.

John holds a BA from Queen's University and the Chartered Investment Manager (CIM) designation.

Portfolio Management Team



Gregory Payne, PhD, CFA

Senior Vice-President, Portfolio Manager, Team Co-Lead

Mackenzie Greenchip Team

Investment experience since 1999

Greg's career in the investment industry began in 1999 with over a decade focused exclusively on environmental sectors. Prior to joining the Greenchip team, Greg held several roles with increasing responsibilities within the portfolio management team for a large capital management firm with over \$200 million of retail and institutional client assets.

Greg holds a BSc from the University of Western Ontario, and both an MA and PhD in Economics from the University of Toronto. He is also a CFA charterholder.

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