

Welcome to this week's presentation and conversation
hosted by the
Canadian Association for the Club of Rome,
a Club dedicated to intelligent debate and action on global issues.

Doing Well by Doing Good

Encouraging indications from corporate revenue and investment trends.

Our speaker today is Ralph Torrie is research director for Corporate Knights, a media and research firm focused on a sustainable economy. Ralph has made original contributions to the field of sustainable development, notably in the development of local government response strategies to climate change. In addition to founding Torrie Smith Associates, he was Assistant Coordinator of the Energy Research Group of the UN University and the International Development Research Centre, and senior executive of two management consulting firms. He represented Canadian environment, development, and peace organizations before the Brundtland Commission and was a Green Party candidate in two Canadian federal elections. Revenues and investments for 2,500 large firms have been measured against Corporate Knights' taxonomy of sustainable production and the results are encouraging. These firms outperform the All Capital World Index and had strong growth through the pandemic. Ralph will summarize the taxonomy, the analysis, and what it indicates may be coming next.

The presentation will be followed by a conversation, questions, and observations from the participants.

CACOR acknowledges that we all benefit from sharing the traditional territories of local Indigenous peoples (First Nations, Métis, and Inuit in Canada) and their descendants.



Website: canadiancor.com
Twitter: [@cacor1968](https://twitter.com/cacor1968)
YouTube: [Canadian Association for the Club of Rome](https://www.youtube.com/channel/UC...)

2023 Mar 01 Zoom #136

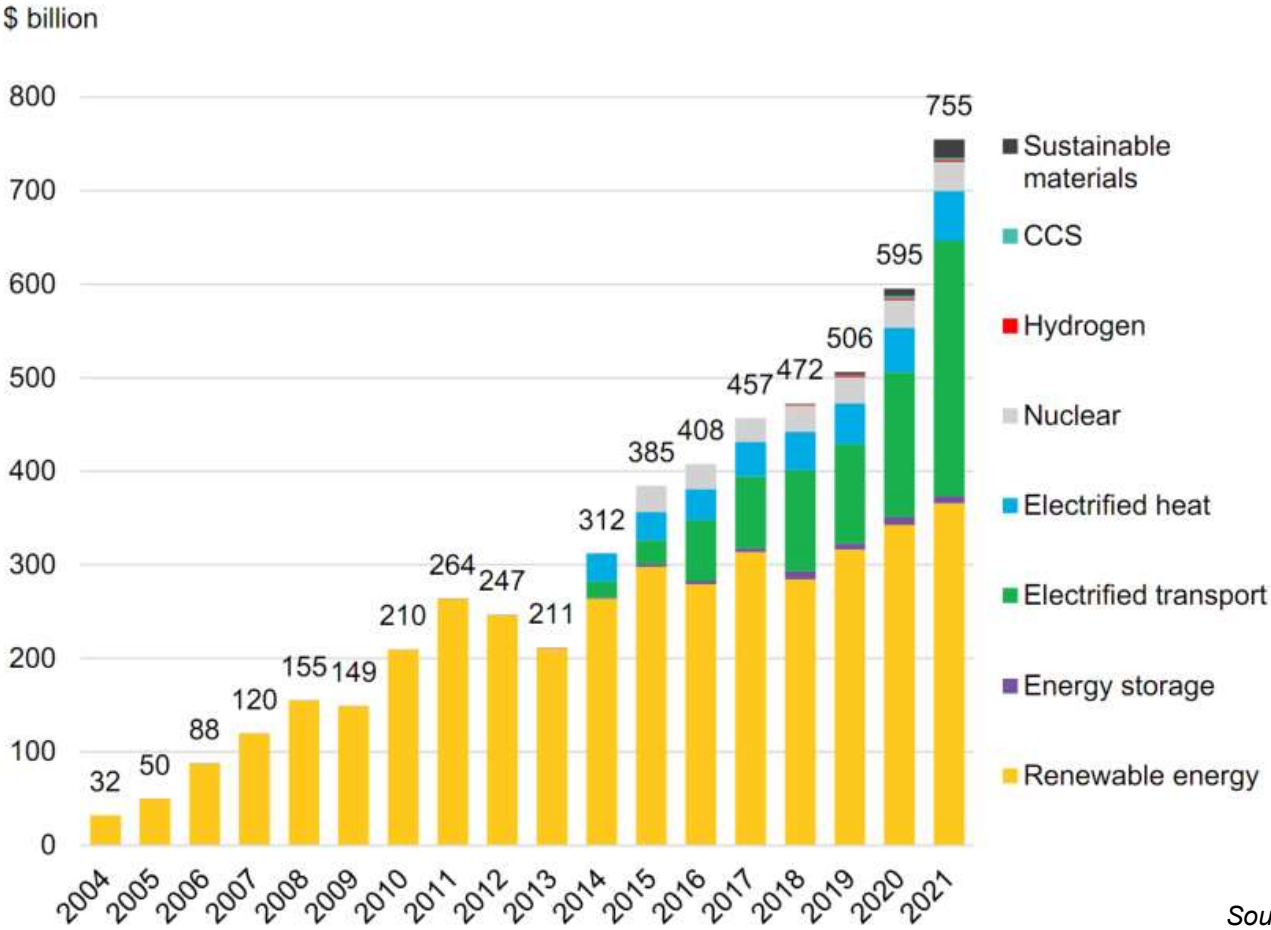


Courtesy of Potsdam Institute for Climate Impact Research, <https://www.pik-potsdam.de/en/home>

The Sustainability Transition

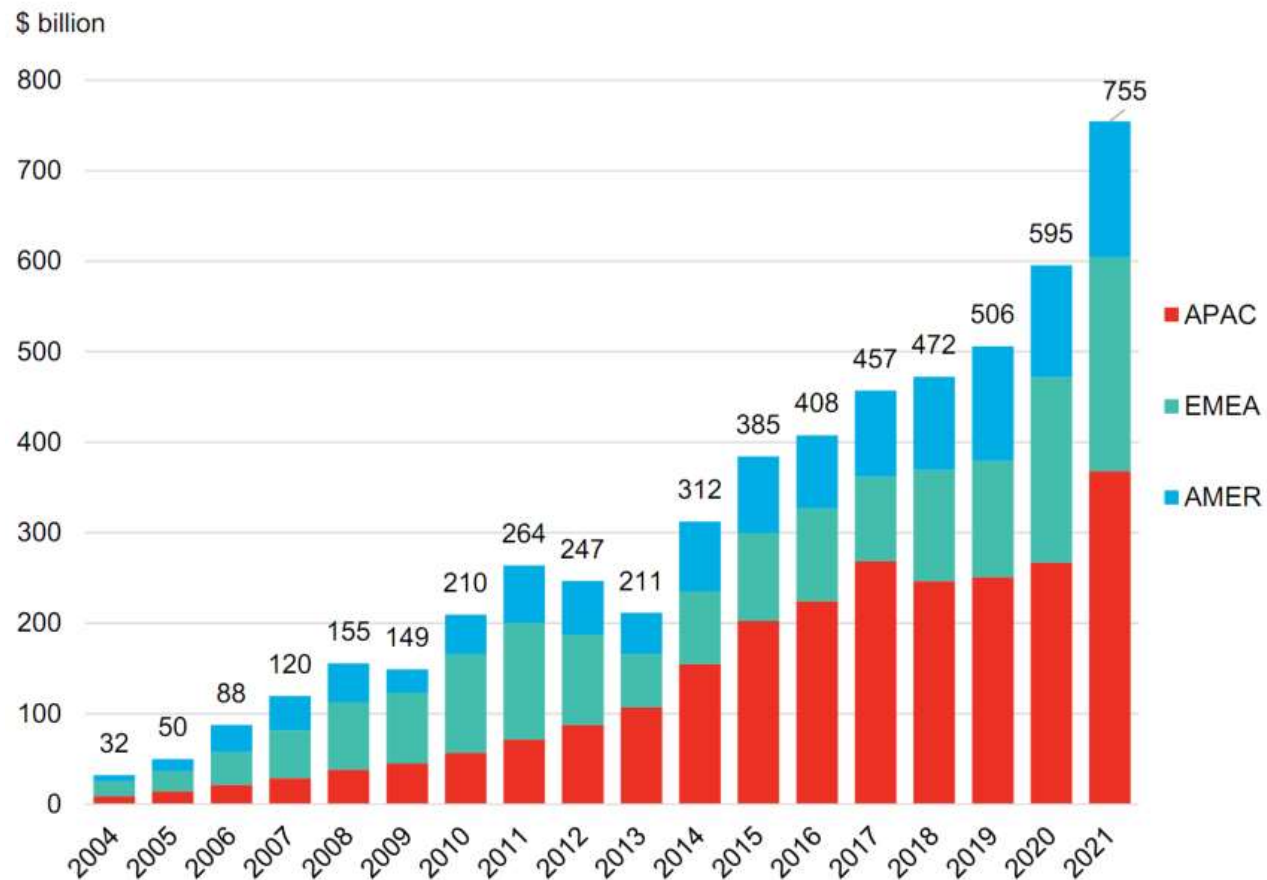
- The global economy is in the early stages of a transition to sustainability. Technological innovation, environmental imperatives, and market trends were moving the system gradually in this direction; **the response to the climate emergency and the growing realization of the economic and geopolitical risks of the status quo are accelerating the change.**
- The sustainability transition is driving and will continue to drive growth in the technologies, materials, and associated services that will largely define the economic history of this century. **Companies with revenues and investments that align with sustainability are establishing their positions in the fast-growing industries that are leading the transition.**
- The Global 100 sustainability rating and ranking is based solely on ESG performance and the alignment of company revenues and investments with the Corporate Knights' Sustainable Economy Taxonomy, but it should not be surprising that **G100 companies continue to track or outpace the market**, as they have been doing consistently for the twenty years since the Global 100 was first launched by Corporate Knights.
- The following slides identify **six themes that are important to the transition**, along with examples of companies in the Global 100 that exemplify their realization. The sustainability transition is multi-dimensional and will affect every aspect of the economy and society, and these themes and company examples should be considered as illustrative but in no way comprehensive in their coverage of the Global 100, let alone the sustainability transition itself.

Growth in clean energy is outpacing the economy, and continued to accelerate through the pandemic...



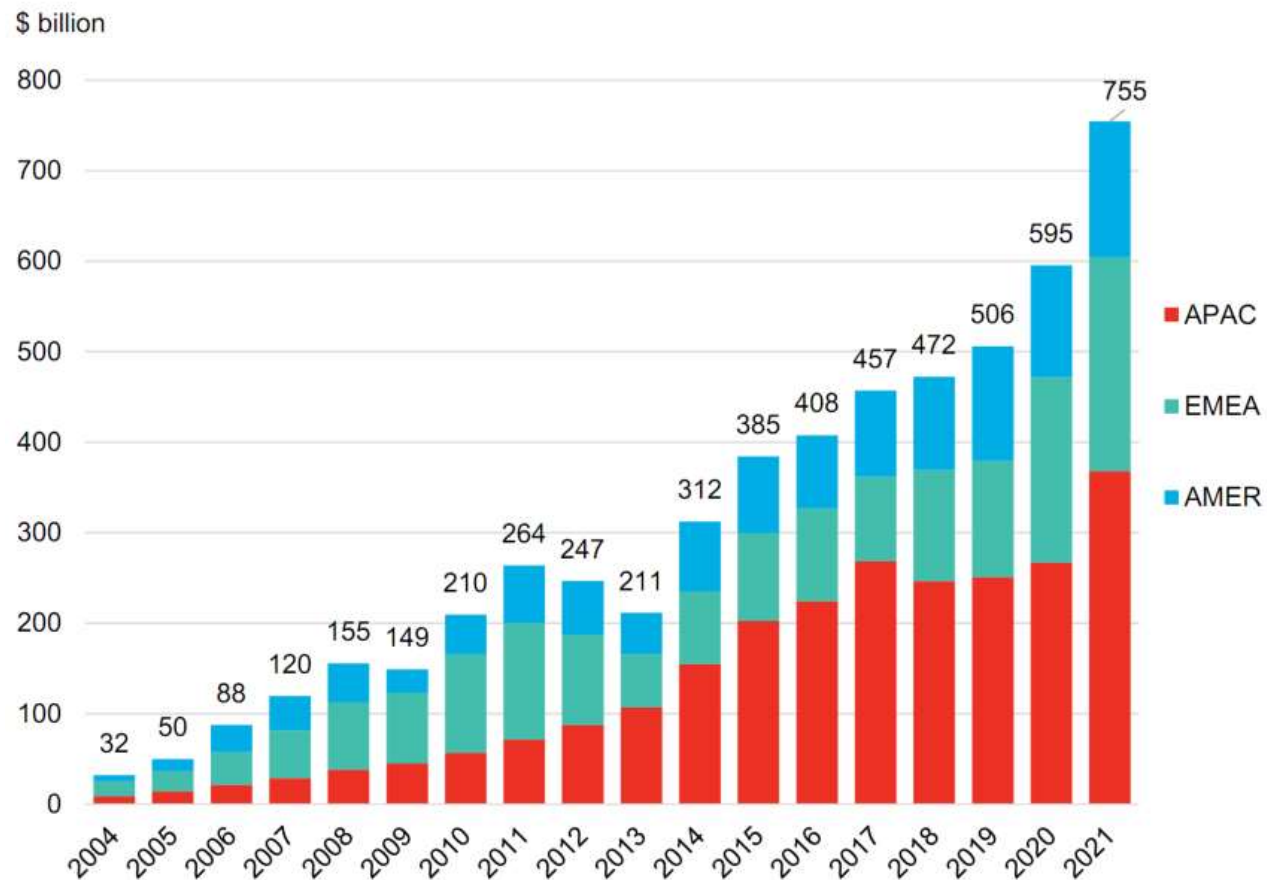
Source: Bloomberg NEF, 2022

Asia (and particularly China) and Europe dominate both the level and the rate of growth of clean energy capex...



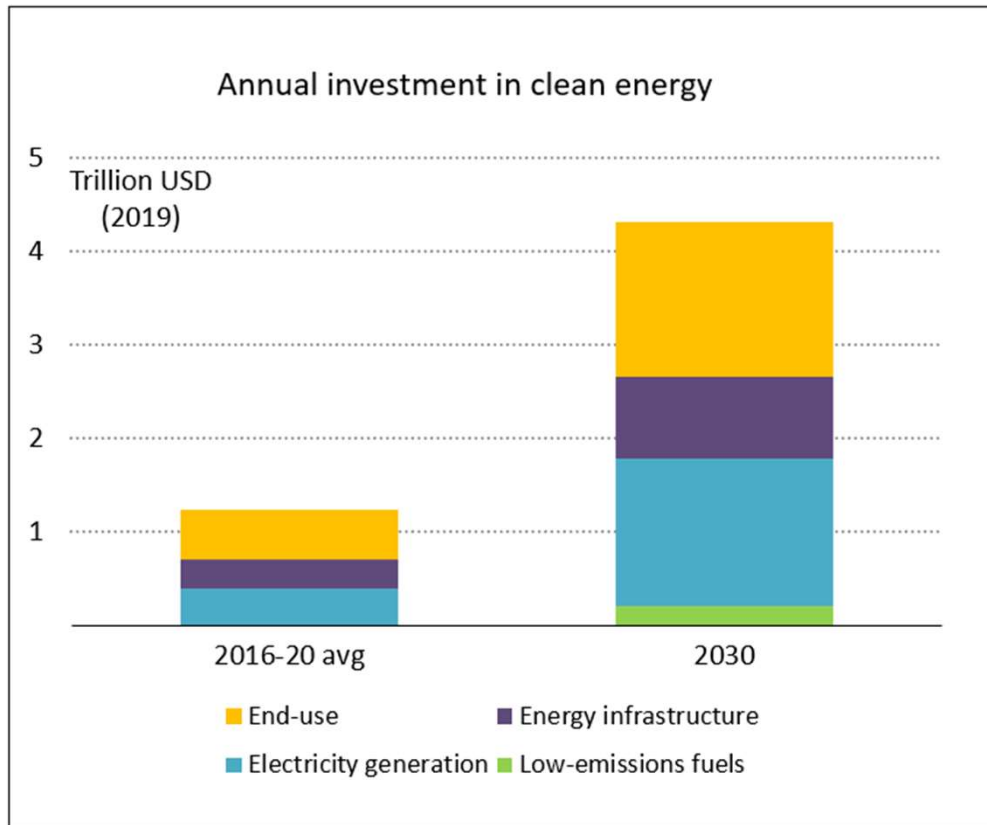
Source: BloombergNEF

Asia (and particularly China) and Europe dominate both the level and the rate of growth of clean energy capex...



Source: BloombergNEF

In responding to the climate crisis, investment in clean energy solutions grows four times faster than world GDP, throughout the 2020's



Based on data from International Energy Agency (2021) Net Zero by 2050: Net Zero by 2050 Scenario - Data product - IEA, as modified by Corporate Knights.

- By 2030, global spending on clean energy reaches 4.3 trillion USD, about **2.5 times the entire Canadian GDP**.
- In the critical next decade of the energy transition, the leading investments are in electricity generation (mostly wind and solar), electricity infrastructure (T&D and digital control of the new grids), electrification of cars and light trucks, and building retrofits (including conversion to heat pumps).
- Conventional biofuels (biomethane and biodiesel) also accelerate, and hydrogen begins to ramp up in the late 2020's.

Selected technologies with projected annual growth rates greater than 10% throughout the 2020's

	Unit	2020	2030	CAGR to 2030
Wind generation	PJ/year	5,727	28,806	24%
Solar photovoltaic generation	PJ/year	2,953	25,072	22%
Liquid biofuels	PJ/year	3,400	13,000	14%
Hydrogen-based fuel	PJ/year	100	3,300	42%
Fossil fuel with CCUS	PJ/year	100	2,800	40%
EV batteries	TWh/year	149	6,356	46%
EV public chargers	GW	46	1,780	44%
EV private chargers	Millions	270	1,400	18%
Cobalt market	USD billions	0.7	15.1	36%
Nickel market	USD billions	2.7	53.5	35%
Rare earth minerals market	USD billions	0.4	4.2	27%
Lithium market	USD billions	1.0	32.6	42%
Stock of heat pumps	Millions	180	600	13%
Smart building market	USD billions	68	267	22%
Plant based protein	USD billions	29	162	19%

The Sustainability Transition – Six Themes

- The New Grid
- Smart buildings
- Transportation transformed
- Circularity
- Decarbonizing Protein
- Renewing the Land

The Sustainability Transition and the Global 100 – Themes and Opportunities

1. The New Grid

- Electricity is on the way to displacing fossil fuel as the largest source of energy end use globally, reflecting the impact of the heat pump and the electric vehicle on electricity's share of heat and transport markets.
- Electrification and grid decarbonization are top priorities in climate change response strategies everywhere, as nations seek to reduce the role of combustion in meeting human energy needs.
- Unprecedented cost reductions in distributed renewable electricity, storage, and digital controls are transforming the grid.
- Investments in the new grid are running well ahead of capital expenditures on other components of the transition and are projected to top US \$15 trillion in this decade.

2. Smart Buildings

- Advances in building technology have redefined comfortable, safe, healthy, and productive indoor environments.
- Growth in the buildings sector is projected to grow at double digit rates throughout the 2020's, averaging US \$1.7 trillion per year.
- The global share of highly efficient buildings with net zero emissions and smart control systems is projected to grow from less than one percent to 25% by 2030 and 85% by 2050.

The Sustainability Transition and the Global 100 – Themes and Opportunities

3. Transportation Transformed

- Vehicle electrification is a cornerstone of the efficiency and decarbonization that will characterize the sustainability transition.
- The electric vehicle population is on a steep growth curve, with the global market expected to reach US \$1 trillion by 2026.
- The transition from combustion engines to electric motors is transforming supply chains in the vehicle sector, with the lithium-ion battery market expected to exceed US \$100 billion by 2030.
- Other drivers of disruption and opportunity in this sector include shifting settlement and mobility patterns, transport-as-a-service (TAS) business models, growing shares of two- and three-wheel vehicles (already dominant in many Asian countries), and modernized public transit infrastructure.

4. Circularity

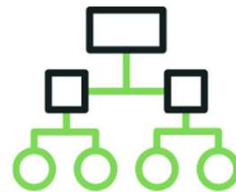
- In the sustainability transition, the “take-make-waste” model of production gives way to circular flows of materials in which products are designed for durability and repair and to facilitate materials recycling and reuse at the product’s end-of-life.
- The environmental impact of reuse and recycling is a fraction of the footprint of “once-through” production and consumption, and the economics of materials reuse and recycling have been steadily improving as ore concentrations decline and the social and environmental costs of mining increase.
- Levels of recycled content are already quite high for some materials like aluminum, steel and paper products, and the circular economy is attracting increasing policy support and business investment.
- The transition to a circular economy is a megatrend and its economic potential is difficult and perhaps too big to measure.

5. Decarbonizing Protein

- Plant-based protein products are 80-99% less greenhouse gas intensive than their meat alternatives and increasing the supply will be essential to sustainably feeding a world population that is now 8 billion and still growing.
- The market for plant-based food sources is growing exponentially and could make up 7.7% of the global protein market by 2030, with a value of over US \$162 billion, up from US \$29.4 billion in 2020.

6. Renewing the Land

- In the sustainability transition, production practices that have impaired the long-term productivity and health of agricultural and forest ecosystems are replaced with regenerative farming and forestry business models that put a premium on high value-added production.
- The combined application of high technology, holistic ecosystem management, and advanced ecological science revitalizes land-based production and revives the prospects for both the companies and the communities that depend on agriculture and forest lands for their livelihoods.



Corporate Knights' Sustainable Economy Taxonomy provides the framework for systematic identification and reporting of sustainable revenue and sustainable investment.

- **Measures corporate contributions to a sustainable economy** by mapping revenues and investments against defined standards, with close alignment to the UN Sustainable Development Goals and EU Taxonomy.
 - Four types of data can be tracked using our Sustainable Economy Taxonomy: **revenue, CapEx, R&D and acquisitions.**
 - The taxonomy includes **definitions for each category**, including accepted certifications and ecolabels (and related thresholds) adopted by Corporate Knights as validation of sustainable revenue or investment.
-



The Corporate Knights innovative sustainable economy taxonomy provides the framework for systematic identification and reporting of sustainable revenue and sustainable investment.

Table A. Structure of Corporate Knights Sustainable Taxonomy Version 6.0 (2022 Revision)

Tier 1	Buildings	Energy	Vehicles	Primary producers	Green products	Water, Waste, and Ecosystem Restoration	Telecommunications and IT	Medicine and Technology	Finance and Insurance	Consulting and Business Services		
Tier 2	Design or construction	Solar photovoltaics	ZEV - zero emission vehicles	Regenerative agriculture	Cleaning products, paints	Water Supply & Distribution	Sustainable broadband services	Essential medicines	Loans and mortgages	Sustainable buildings		
Tier 2	Own or manage	Wind power	Charging or refueling infrastructure	Sustainable Cement	Fabrics and apparel	Water efficient technologies	Internet infrastructure, cloud-based services, and equipment	Medical Equipment	Institutional & client investments	Sustainable energy		
Tier 2	HVAC equipment	Other renewable electricity	Sustainable vehicle supply chain	Sustainable steel	Organic food, protein & dairy alternatives	Water treatment & quality monitoring	Software	Other	Bond underwriting and advisory services	Sustainable vehicles		
Tier 2	Building Materials	Sustainable biofuels	Active transportation infrastructure	Sustainable aluminum	Biodegradable and cradle to cradle products	Wastewater treatment	Sustainable telepresence services		Environmental insurance services	Sustainable primary production		
Tier 2	Other	Green hydrogen	Other	Sustainable forest products	Products made from recycled	Organic waste treatment	Green logistics		Other	Green products		
Tier 2		Other non-electric renewables		Sustainable mining	Eco certified products	Material recovery and recycling technology	Other			Water and waste		
Tier 2		Energy storage		Sustainable inorganic chemicals	Product as a service	Pollution reduction and prevention					Telecommunications & IT	
Tier 2		Transmission of Sustainable energy		Sustainable organic base chemicals	Packaging	Ecosystem restoration or Sustainableup						Essential medicine
Tier 2		Smart grid technology		Sustainable plastics	Other	Carbon capture and storage						
Tier 2		Other		Other	Other	Other						Other

The CK Sustainable Economy Taxonomy includes definitions for each of the categories in its tiered structure, and lists certifications and ecolabels accepted by Corporate Knights as validation of sustainable revenue or investment. It is a living document, with suggestions from reporting companies a key input to its ongoing improvement. While broader in scope, it aligns with the emerging EU taxonomy in areas of common coverage.

Tier 1	DESCRIPTION	Tier 2	Description	Certifications	Notes
Buildings	A "CK clean building" is defined as one that does not use fossil fuels (i.e. zero emission) and in which electric resistance heat represents less than 20% of total building heat supply. In addition to being emission free, the building must also meet a high standard of energy efficiency, as evidenced by compliance with a third party certification. This category also includes building construction materials and components and the electrically powered components of HVAC systems.	Design or construction	Investment in or revenue from design and/or construction of CK clean buildings, including existing buildings that are retrofitted so they conform to the CK clean building definition. See the link in Column E for the list of CK approved certifications, but companies are invited to include other certifications, which we will then assess for inclusion in our list of qualified certifications.	Approved Certifications for Design and Construction	The certifications listed in Column E are indicative. Where other certifications are used to support green investment, please provide the name of the certification and Corporate Knights will evaluate whether it meets the necessary condition for a certification to be acceptable.
		Own or manage	Investment in or ownership or management and operation of CK clean buildings. (Note: Revenue from activity taking place in a CK clean building does qualify as clean revenue, with the exception of the hospitality industry.) See the link in Column E for the list of CK approved certifications, but companies are invited to include other certifications, which we will then assess for inclusion in our list of qualified certifications.	Approved Certifications for Own and Managed Buildings	
		HVAC equipment	High performance (energy efficient), electrically powered fans, pumps, compressors, heat pumps, and associated control systems. Excluded: fossil fuel furnaces and boilers, electric resistance heating for space or water). See the link in Column E for the list of CK approved certifications, but companies are invited to include other certifications, which we will then assess for inclusion in our list of qualified certifications.	Approved Certifications for HVAC Equipment	
		Building Materials	High performance or ecologically certified building construction materials and components, including windows, doors, walls, insulation, LED high efficiency lighting, daylighting, green roofs, floor coverings, recycled construction materials, building air quality and energy control technologies. See the link in Column E for the list of CK approved certifications, but companies are invited to include other certifications, which we will then assess for inclusion in our list of qualified certifications.	Approved Certifications for Building Materials	
CK clean energy is defined as zero carbon, renewable electricity, solar thermal, energy storage, geothermal, sustainable	Solar photovoltaics	Solar photovoltaics, including supply chain			This subcategory can be used in situations where the total zero carbon electricity is known but the breakdown (wind and solar) is not provided. <ul style="list-style-type: none"> Revenue from hydroelectric plants online by January 1, 2020 qualifies as green revenue, as does investment in new hydro plants greater than 30 MW is excluded. Nuclear is excluded. Forest biomass combustion for electricity generation is excluded.
	Wind power	Wind power, including supply chain			
	Other renewable electricity	Wave, tidal, geothermal, small hydro (less than 30MW)			

OVERVIEW

Coverage	<ul style="list-style-type: none"> • Global, all industries • Over 2,800 publicly traded companies, including MSCI ACWI, S&P 500, Transition Pathways Initiative
Year initiated	2019
Data sources	<ul style="list-style-type: none"> • Direct data pull from annual reports, sustainability reports, proxy/management circulars • Direct engagement with companies • Carbon Disclosure Project (CDP) filings • Climate Bond Initiative (CBI) reports
Reporting frequency	Monthly
Subscription term	Annual
Inclusions	<ul style="list-style-type: none"> • Raw data and related notes and sources for revenue, capital expenditures, research & development, mergers & acquisitions that align with the Corporate Knights Sustainable Economy taxonomy, disaggregated by company, by location of company headquarters, by taxonomy category, and by industry group (CKPG). • Sustainable revenue and investment ratios by company • Corporate Knights Sustainable Economy Taxonomy and approved sustainability certifications (including notices of all updates) • Corporate Knights Peer Group (CKPG) to NAICS concordance

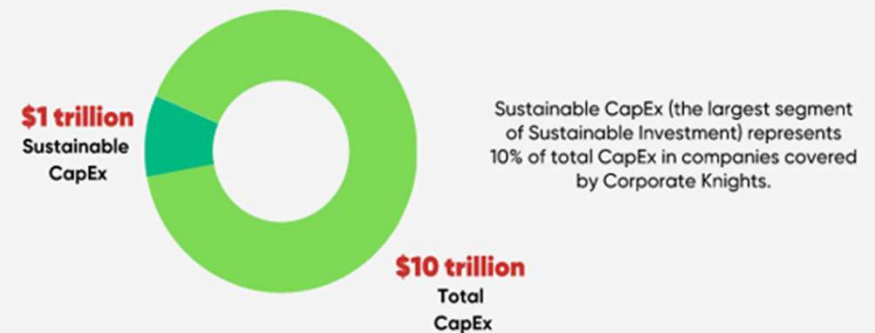
WE HAVE FOUND...

\$10 trillion

SUSTAINABLE REVENUE
(2019-2021)

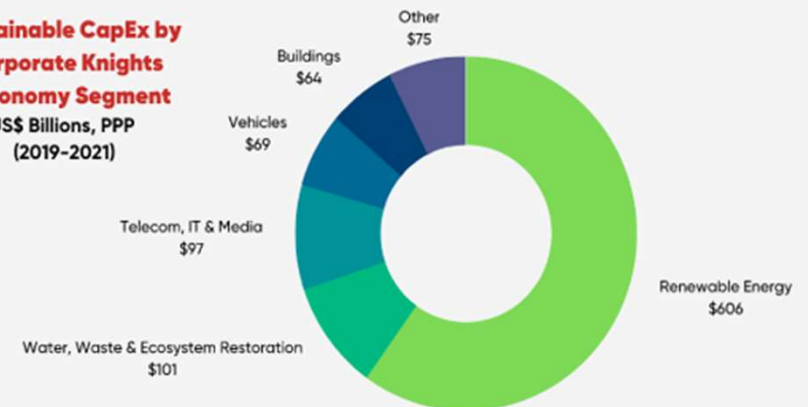
\$1.3 trillion

SUSTAINABLE INVESTMENT
(2019-2021)



Sustainable CapEx by Corporate Knights Taxonomy Segment

US\$ Billions, PPP (2019-2021)





Overview

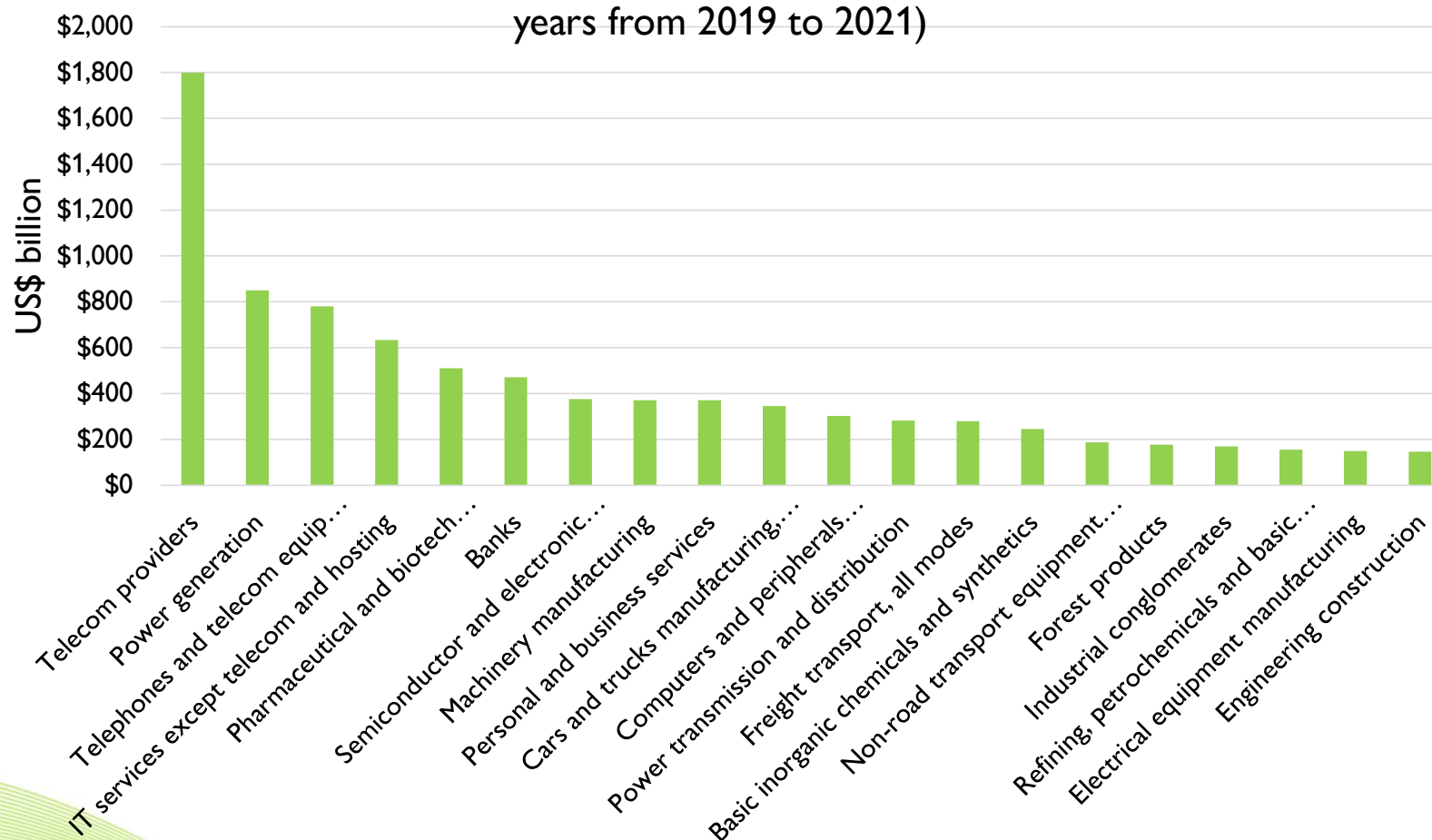
Sustainable Economy Intelligence

	Revenue	Investment
No. of company-years reviewed (2019 to 2021):	7,610	6,483
of which sustainable revenue/investment found in:	2,910	2,990
Sustainable revenue/investment (US\$ billions, PPP)	\$10,207	\$1,330
Gross revenue/investment of reviewed companies (US\$ billions, PPP):	\$143,498	\$15,281
Sustainable revenue/investment as percent of gross in reviewed companies:	7.1%	8.7%
Percent of reviewed company-years with sustainable revenue/investment:	38%	46%
Data as of February 24, 2023		

Commercial Confidential and Preliminary Data extract on February 24, 2023
© Corporate Knights, 2023



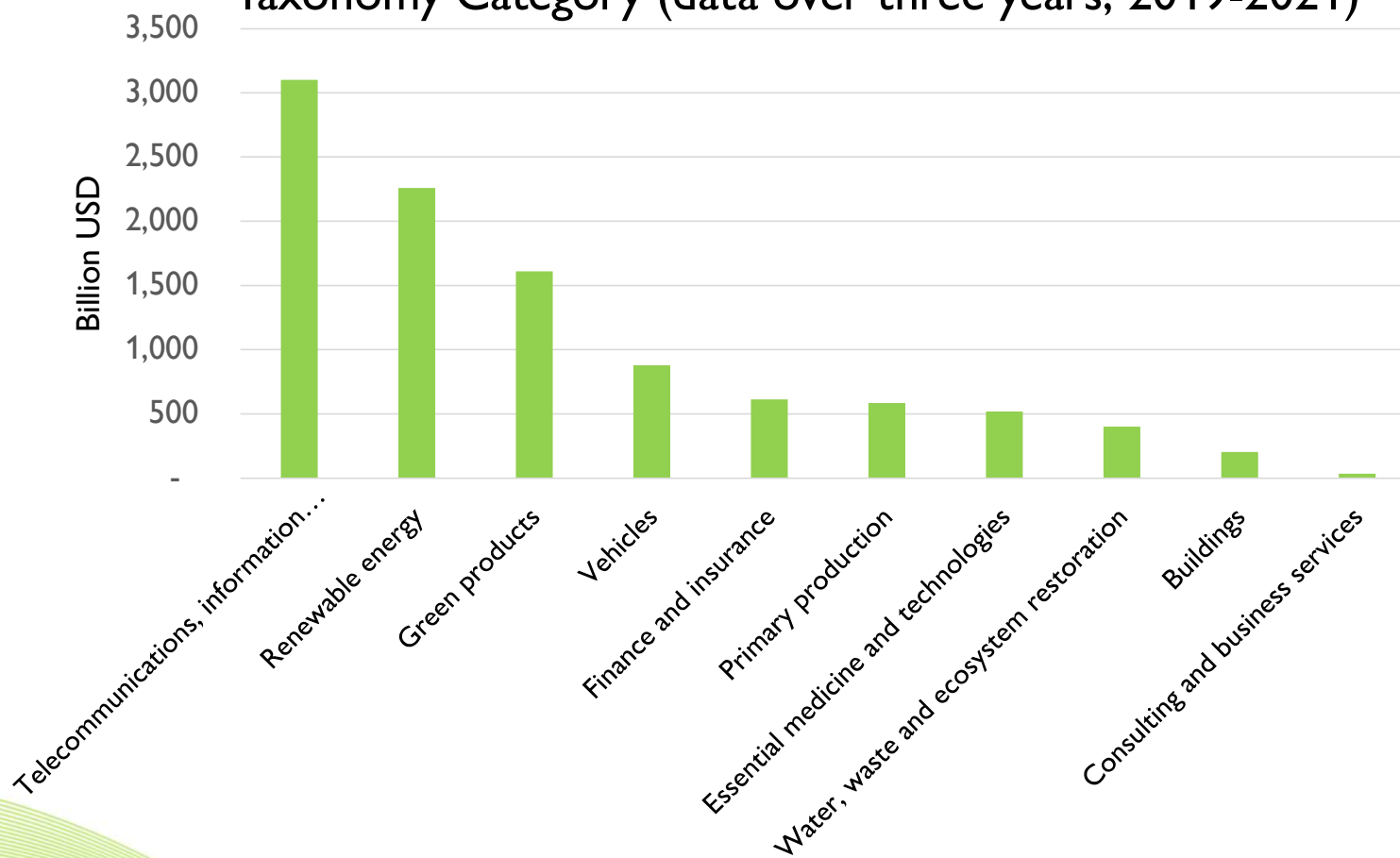
Sustainable Revenue by Corporate Knights industry category (CKPG) (Top 20 CKPGs with sustainable revenue identified in reviewed company- years from 2019 to 2021)



Commercial Confidential and Preliminary Data extract on February 24, 2023
© Corporate Knights, 2023



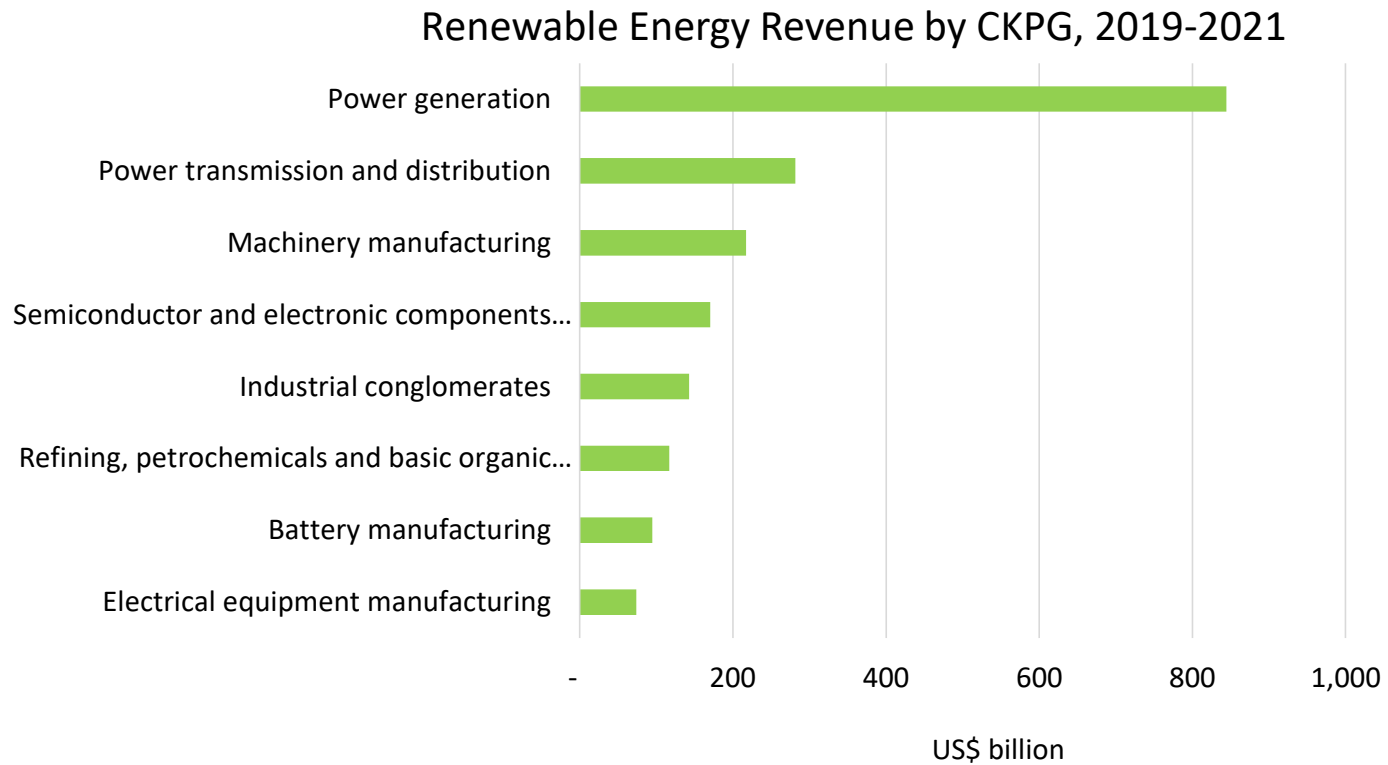
Sustainable Revenue by Corporate Knights Tier 1 Taxonomy Category (data over three years, 2019-2021)



Commercial Confidential and Preliminary Data extract on February 24, 2023
© Corporate Knights, 2023



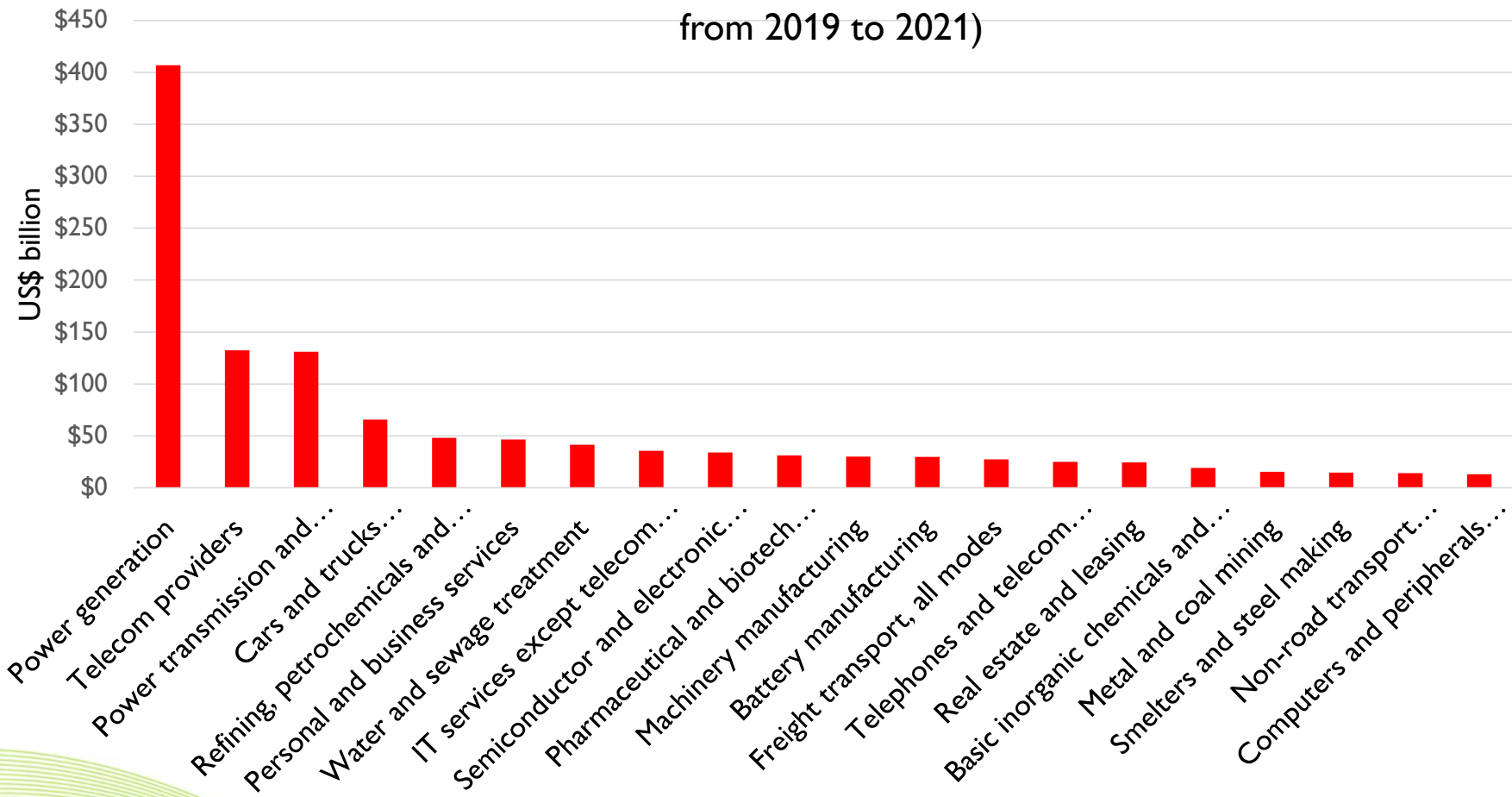
Sustainable revenue for any segment of the taxonomy can be disaggregated by industry (CKPG), indicating the sectors and companies contributing to the supply chains of the sustainable economy.



Commercial Confidential and Preliminary Data extract on February 24, 2023
© Corporate Knights, 2023



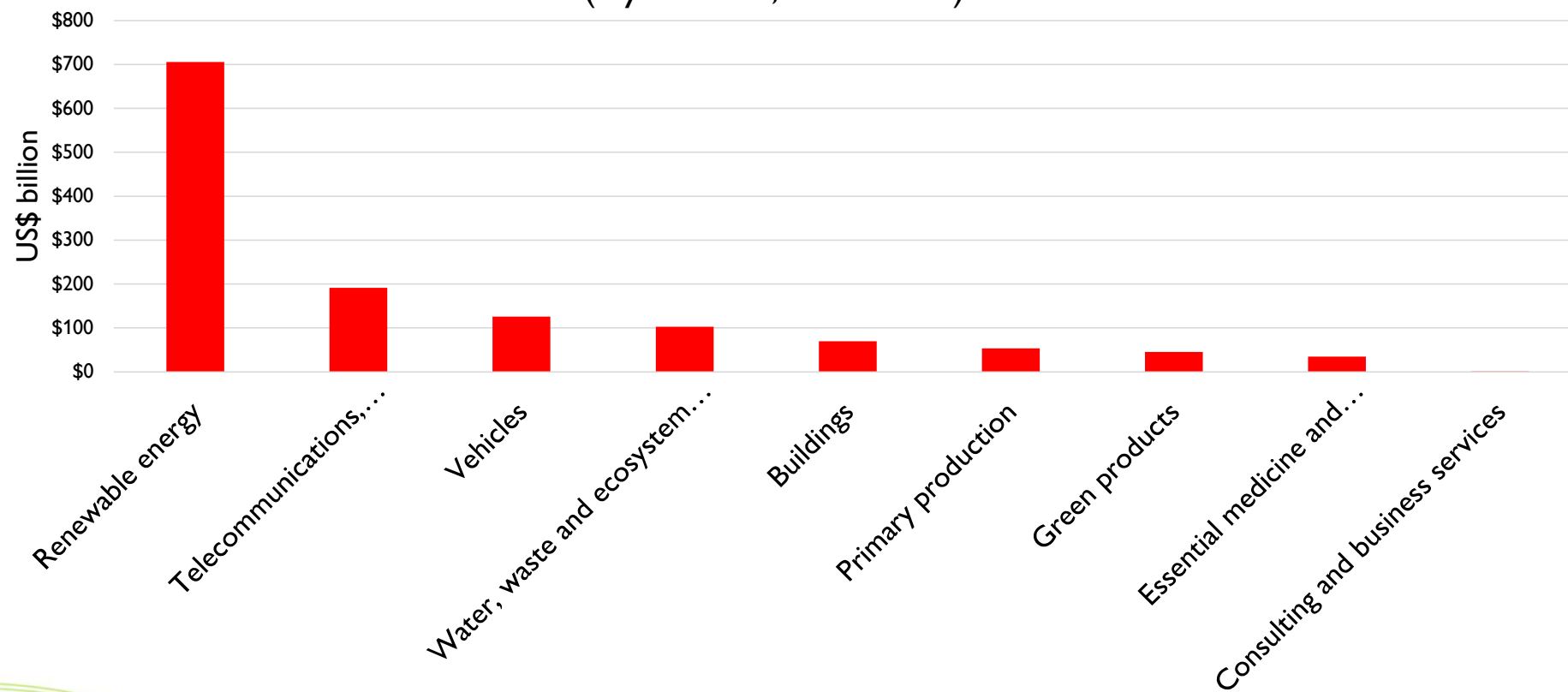
Sustainable Investment by Corporate Knights Industry Category (CKPG) (Top 20 CKPGs with sustainable investment identified in reviewed company-years from 2019 to 2021)



Commercial Confidential and Preliminary Data extract on February 24, 2023
© Corporate Knights, 2023



Sustainable Investment by Corporate Knights Taxonomy Tier 1 Category (3 year total, 2019-2021)

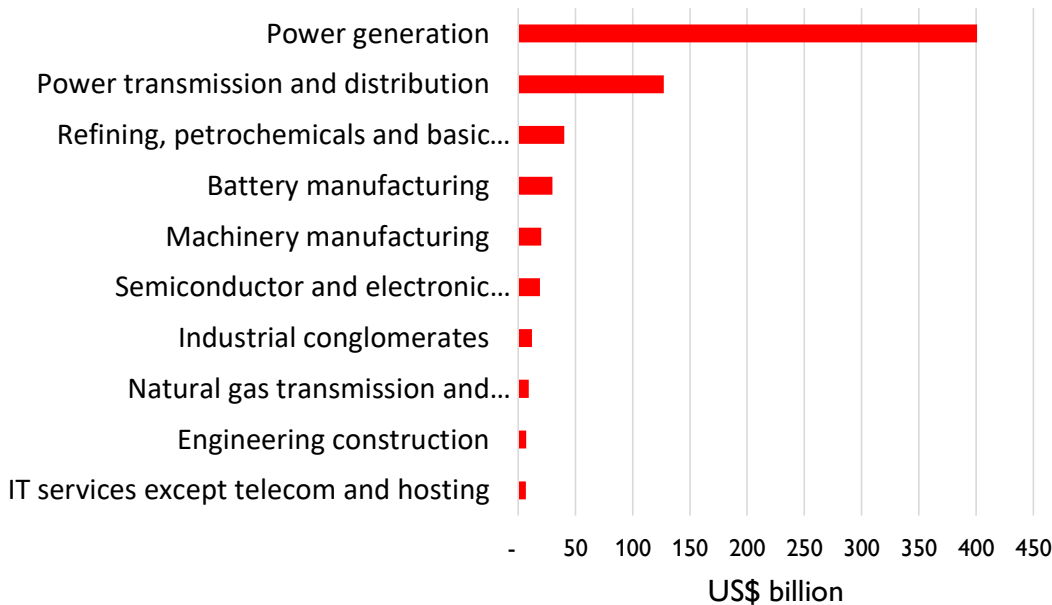


Commercial Confidential and Preliminary Data extract on February 24, 2023
© Corporate Knights, 2023

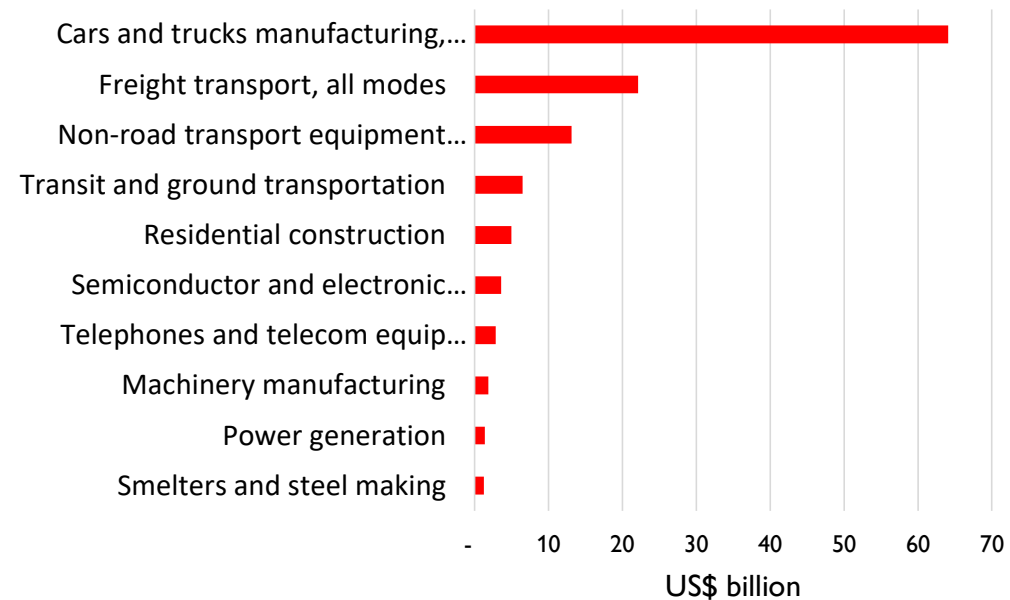


The granularity of the Sustainable Economy Intelligence database supports deep analysis of revenue and investment by company, industry (CKPG), sustainable economy segment (CKSET), country, and other variables.

Renewable energy investment by CKPG
Top 10 CKPG's, 2019-2021 data



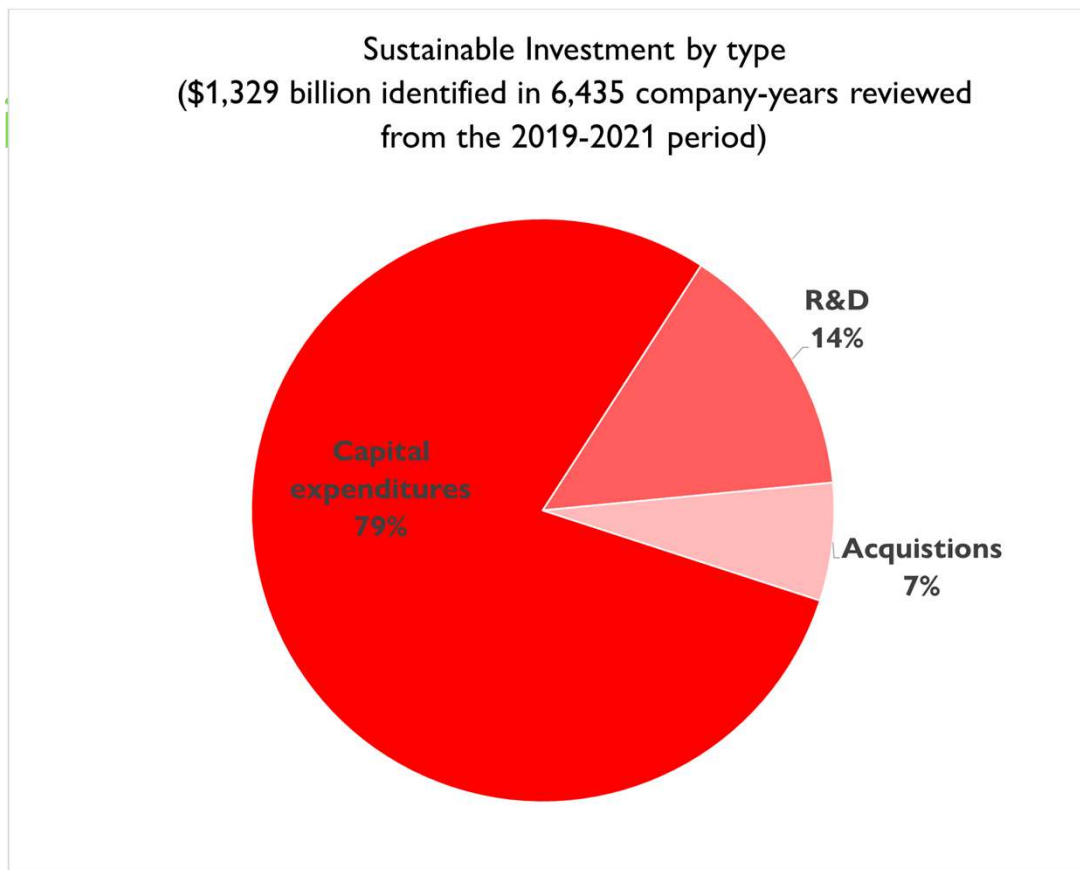
Emission free vehicles investment by CKPG
Top 10 CKPG's, 2019-2021 data



Commercial Confidential and Preliminary Data extract on February 17, 2023
© Corporate Knights, 2023



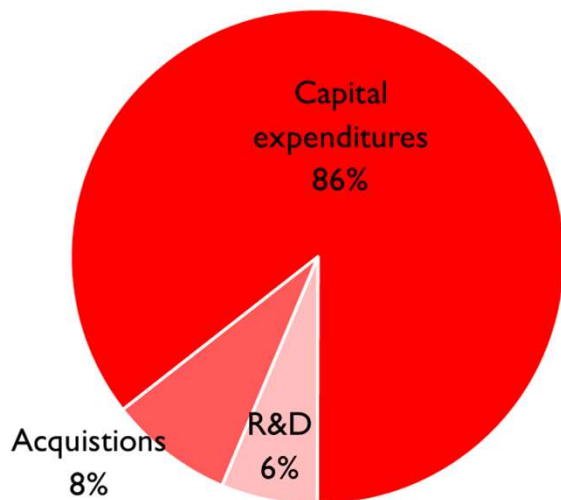
Sustainable investment in our database includes capital expenditures, R&D, and acquisitions, which can be disaggregated by location, CKPG, and CKSET category.



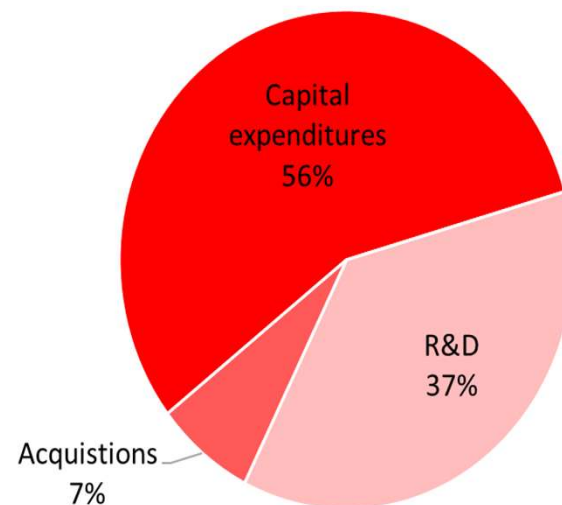
Commercial Confidential and Preliminary Data extract on February 17, 2023
© Corporate Knights, 2023



Renewable energy investment by type



Emission free vehicles investment by type



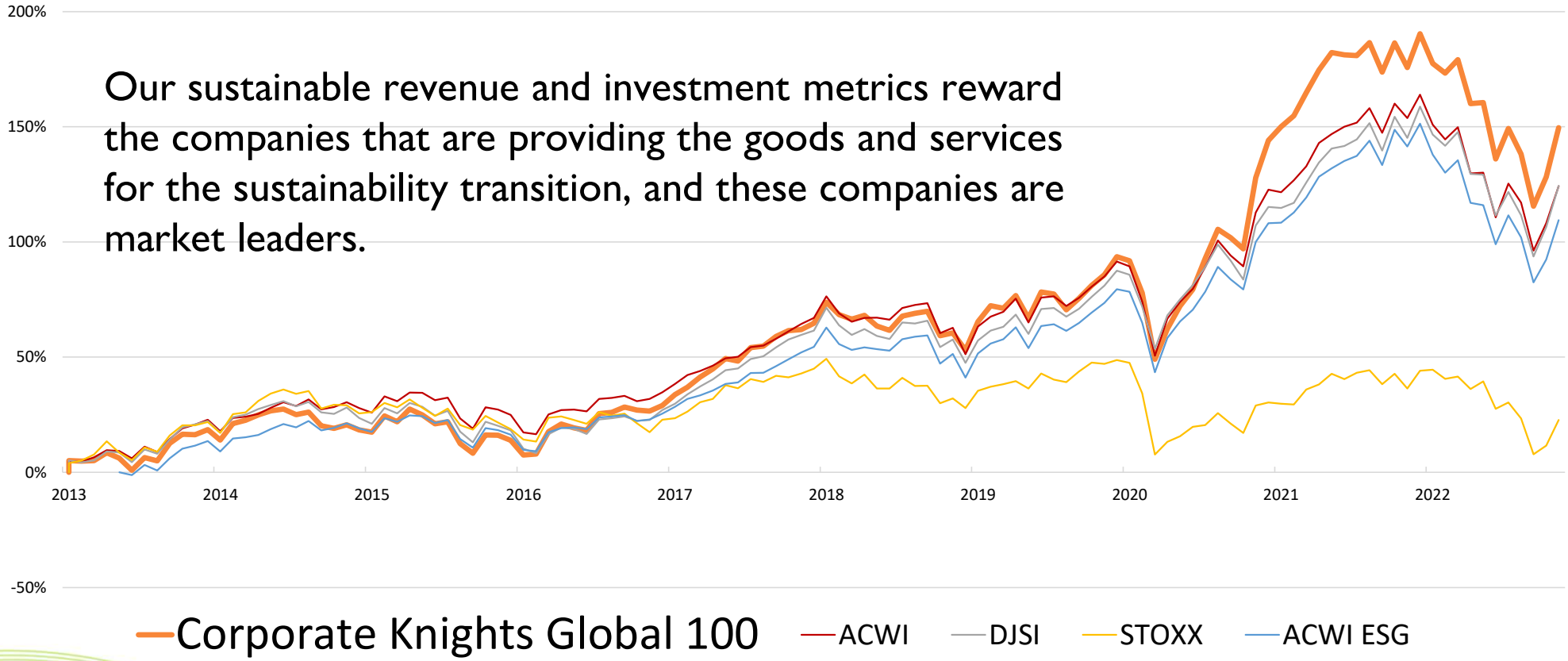
Commercial Confidential and Preliminary Data extract on February 17, 2023
© Corporate Knights, 2023

Competitive Advantage:

Corporate Knights Sustainable Economy Intelligence



Our sustainable revenue and investment metrics reward the companies that are providing the goods and services for the sustainability transition, and these companies are market leaders.



For more information:
rtorrie@corporateknights.com

www.corporateknights.com



Global 100 companies: champions of **the New Grid**

Ørsted

Ørsted exemplifies a new generation of integrated energy companies that are building the 21st century's electric grid. They develop, construct, operate, and own solar farms, offshore and onshore wind farms, energy storage facilities, and bioenergy plants.



Brookfield

Renewable Energy Partners

With 21,000 MW of capacity, Brookfield REP is one of the largest public renewable pureplay companies in the world. Their portfolio extends to North and South America, Europe and Asia and includes solar, wind, hydroelectric, pumped storage, as well as cogeneration and biomass.

Global 100 companies: champions of **Smart Buildings**



With properties in 103 locations in 29 countries, City Developments Ltd is implementing electrification and smart building technologies to digitalize and decarbonize its portfolio. In its Singapore buildings alone, they have 114 BCA Green Mark certifications, reflecting their commitment to the highest standards of energy efficiency and sustainability.

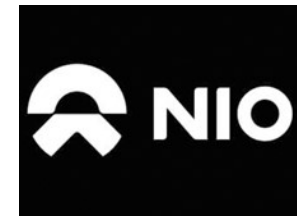


With a systematic, whole building approach to sustainability, Sino Land Company invests extensively in energy efficiency and smart building management technology, water efficient technologies, food waste decomposers, and electric vehicle chargers. Operating as an investment holding company, Sino Land Company develops, manages, and trades in properties in China, Hong Kong, Australia, and Singapore.

Global 100 companies: champions of **Transportation Transformed**



Taiwan High Speed Rail Corporation manages and operates a high-speed electric rail system in Taiwan. The company generates its own solar electricity and sells surplus power to Taipower, a state-owned Taiwanese power company.



NIO is a Chinese automaker that not only manufactures electric vehicles but also provides energy and service packages to users, battery packs and components, home charging stations, battery swapping services, and a mobile charging service utilizing charging vans.

Global 100 companies: champions of **Circularity**



With a dual focus on recycling and electrotechnology that utilizes clean electricity, Schnitzer Steel recycles and processes ferrous and non-ferrous scrap, including vehicles, appliances, and industrial machinery. Operating globally, they are making a sizeable contribution to advancing the circular economy around the world.



USD \$5.6 billion revenue and
USD \$1.7 billion investment
100% sustainability aligned in
2021.



Brambles

A leader among companies with business plans focused on reuse and recycling, Brambles manages a network of reusable pallets, crates and containers. Its operating model innovates a "share and reuse" model, offering an alternative to single-use crates and containers for the supply chains of fast-moving consumer goods, fresh produce, beverage, retail, and manufacturing industries.

Global 100 companies, champions of **Plant-based Protein**



Operating throughout Mainland China, Hong Kong, Australia, New Zealand and Singapore, Vitasoy produces food and beverage products that are solely plant-based.



USD \$5.9 billion revenue sustainability aligned in 2021

USD \$10.9 billion revenue sustainability aligned in 2021



A Norwegian-based conglomerate, Orkla ASA earns 57% of its revenue from vegetarian and vegan products. The company recently established a new venture -- Orkla Alternative Proteins (OAP) -- to specifically coordinate and strengthen its plant-based food product portfolio.

Global 100 companies: champions of **Renewing the Land**



Epitomizing the future of forest-based production, Cascades Inc. paper and packaging products are 83% made from recycled fibre and 100% certified by the Forest Stewardship Council. A North American company, Cascades product portfolio comprises a wide variety of products, from paper towels and facial tissues to specialty containers and protective packaging.



USD 4 billion revenue in 2021
92% sustainability aligned



Investments in 2021 97%
sustainability aligned

CHR HANSEN

A leader in the burgeoning bioeconomy, CHR Hansen develops natural ingredient solutions for the food, nutritional, pharmaceutical, and agricultural industries. It is also developing microbial-based bio-solutions to improve the quality and health of the soil while preserving the microbial biodiversity.