

Playing it cool

Which cooling companies are ready for the low-carbon transition?

Executive Summary

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Authors: Carole Ferguson, Kane Marcell, Alice Newman, Jinxi Chen and Emma Amadi

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Authors:
Carole Ferguson
Kane Marcell
Alice Newman
Jinxi Chen
Emma Amadi

Acknowledgements:
Tom Crocker

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Linking climate-related metrics to earnings for the Cooling sector

This is an initiation report on the Cooling Sector which covers companies that provide products and services in air conditioning and refrigeration to the residential, commercial and industrial sectors. This expands our research in the Capital Goods sector and includes new coverage in the Consumer Electronics sector. The league table ranks 18 of the highest-impact publicly listed cooling companies on business readiness for a low-carbon transition.

The companies in aggregate account for around 60% of global revenues for the sector, covering the US, Japanese, Korean and Chinese companies that dominate the sector. Electrolux is the only European company covered in this report. Companies included are either pure plays such as Daikin Industries or diversified companies such as Samsung Electronics with cooling products and services.

The cooling sector represents a significant revenue opportunity for companies, with increasing demand expected for cooling products in the coming decade as a result of rising temperatures, population and economic growth, and rapid urbanization. The increase in cooling products will vary in different regions depending on how these demand drivers develop.

China, India, the US and Japan are principal markets for residential cooling appliances for this universe of companies. China accounted for the largest share with an estimated two thirds of air conditioning unit sales by volume and nearly half of refrigeration sales. China is still growing but at a slower pace particularly for air conditioning and companies more exposed to rapid growth markets such as India are better positioned. In 2018, India accounted for less than 15% of companies' residential refrigeration unit sales and under 5% for air conditioning.

The rising demand for space cooling drives growing electricity demand and accounted for 14% of peak demand in 2016 with carbon emissions from space cooling tripling since 1990 according to the IEA. Based on the IEA baseline scenario to 2050, space cooling becomes the strongest driver of growth from buildings electricity and is expected to place a significant burden on peak electricity demand in a number of countries. This comes at a time when electrification is expected to provide solutions to decarbonize other sectors shifting away from fossil fuels such as transport.

Space cooling and refrigeration have an integral role to play in terms of health and community issues with refrigeration important in food and medical supply chains. The cooling sector is at the nexus of climate change, health and consumer behavior and preferences. As health issues are amplified by the current Coronavirus pandemic, the link of heat stress and human well-being, as well as the role of cooling for vaccine availability, could come more to the fore.

Space cooling will be needed most where temperature rise is disproportionately high such as in India. In parallel, refrigeration is important to our food systems where 25-30% of total food produced is lost or wasted.¹ Food loss predominantly takes place early in the supply chain during production, transportation and storage, driven by lack of access to technology and cold-storage infrastructure.²

Given the growing societal demand for cooling technologies, **companies delivering these cooling products and services will need to innovate to deliver significant emissions reductions through step change solutions to technology**, or introducing system solutions incorporating renewables such as solar panels to reduce grid emission factors.

As with most product sectors, **the key emissions are from Scope 3 Use of Sold Products** – in this case 20% directly from refrigerants with high Global Warming potential such as HFCs with 80% indirectly from the energy use from products.

To address these emissions, the sector has attracted regulation to phase down fluorocarbon refrigerants (the Kigali Amendment) and Minimum Efficiency Performance Standards (MEPS) to improve product efficiency and labelling.

Two key metrics used in this report to evaluate companies – product efficiency and innovation, reveal the sector is behind the curve. There is a significant gap between deployment of Best Available Technologies (BAT) and MEPS and a lack of innovation. This is reinforced by financial ratios such as R&D spend and CAPEX to sales ratio, which show the sector lags other Capital Goods sectors.

There are three key areas assessed in the League Table, which are aligned with the recommendations from the TCFD:

Transition risks: We assess companies on the efficiency of product portfolios, the quality of their Scope 3 disclosure and management of regulatory and other substantive risks.

Transition opportunities: We assess companies on their low-carbon product innovation, investment in R&D and patents filed and exposure to high growth markets.

Climate governance and strategy: We analyse companies' governance frameworks including emissions reduction targets and the alignment of governance and remuneration structures with low-carbon objectives.

1. IPCC, Climate change & land, 2020

2. McKinsey, Reducing agricultural emissions through improved farming practices, 2020

Key findings

- ▼ **Trane Technologies, LG Electronics and Mitsubishi Electric** lead the companies, with emerging market companies Blue Star and Chigo lagging.
- ▼ **Product regulation is recognised as a key substantive risk for this sector** and therefore, measuring and managing the carbon emissions of product portfolios is critical.
- ▼ **95% of emissions in the lifecycle are mostly in Scope 3 Use of Sold Products**, which is exposed to product regulations including Minimum Energy Performance Standards (MEPS), energy rating labels and refrigerant requirements.
- ▼ **Only seven companies have over 50% of sales in better regulated markets**, with financial incentives for energy efficient products, including the US, EU and Japan.
- ▼ Despite citing product regulation as a key risk, **CAPEX to sales ratio is relatively low, averaging 1-2%** with higher spending by diversified companies in other business areas.
- ▼ **Cooling specific R&D as a percentage of net sales only averaged 2.2%**, which falls well below the Capital Goods average of 3.5%.
- ▼ Product efficiency analysis reveals a **significant gap of 58% on average between MEPS and BAT** for the popular category of split ACs.
- ▼ **Across the full suite of split AC products the gap is on average 17%.**
- ▼ **Gaps between MEPS and BAT is prominent in countries like India** despite MEPS updates as recently as 2020.
- ▼ **Scope 3 emissions disclosure is strong relative to other sub-sectors within Capital Goods.** 61% of companies disclose Use of Sold Products.
- ▼ Despite Scope 3 accounting for a significant proportion of the sector's emissions, **just six companies have Scope 3 emissions reduction targets on Use of Sold Products.**
- ▼ **Four companies have set targets to reduce emissions throughout the value chain by 2050:** Hitachi and Mitsubishi Electric are targeting an 80% reduction, while Daikin Industries and Electrolux aim to achieve net-zero emissions.
- ▼ **There is a lack of innovation in residential cooling technologies** with little evidence of alternative technologies to vapour compression systems.
- ▼ Despite innovation being key to managing the growing emissions for the sector, **most companies' sustainable innovations only deliver incremental efficiency gains.**
- ▼ This is reflected by the fact **60% of patents filed were focused on compressor design** which is incremental in nature.
- ▼ **Only 5% of innovations are evaluated as being transformative**, as this requires integrating scalable demand management solutions such as smart grid and renewable sources.
- ▼ **35% of innovations are evolutionary**, including ultra-low GWP refrigerants, in line with the Kigali Amendment ambitions.
- ▼ **Only five companies have comprehensive product take-back or end-of-life refrigerant management programs.**
- ▼ **12 companies have some form of climate-related objectives in incentive schemes for senior executives**, but these are mainly short-term with long-term incentives needed for commitment to advance low-carbon performance.
- ▼ Overall, disclosure quality is high with almost **60% of disclosing companies achieving a CDP score of an A- or higher.** This compares with 45% for Capital Goods and 53% for Consumer Good sectors.
- ▼ **Companies in the sector are relatively well positioned for financial resilience.** 44% of companies have free cash flow/sales ratios over 5% and 44% of companies have net debt/EBITDA ratios below 1.

The summary League Table below presents headline company findings. It is based on detailed analysis across a range of carbon and transitional indicators which could have a significant impact on company performance. The League Table is designed to serve as a proxy for business readiness in an industry which will face increasing challenges as governments increase efforts to implement the Paris Agreement. Companies placed towards the bottom are deemed less prepared for a low-carbon transition.

Figure 1: League Table summary⁽ⁱ⁾

LT rank	Company ⁽ⁱⁱ⁾	Country	Market Cap US\$bn (as of May 2020)	Weighted rank	Transition risks rank	Transition opportunities rank	Climate governance & strategy rank	Revenue split (%)
1	Trane Technologies	USA	22	6.13	8	1	1	
2	LG Electronics	South Korea	8	6.50	2	4	5	
3	Mitsubishi Electric	Japan	29	6.68	1	10	3	
4	Samsung Electronics	South Korea	243	7.17	4	6	6	
5	Panasonic	Japan	22	7.20	7	9	2	
6	Daikin Industries	Japan	43	7.39	10	2	4	
7	Carrier ⁽ⁱⁱⁱ⁾	USA	17	7.81	6	7	9	
8	Electrolux	Sweden	5	8.34	3	17	8	
9	Johnson Controls	USA	24	8.61	12	5	10	
10	Hitachi	Japan	32	8.70	9	13	7	
11	Lennox International	USA	8	9.03	5	15	12	
12	Mitsubishi Heavy Industries	Japan	9	9.84	11	14	11	
13	Haier	China	15	12.91	14	8	16	
14	Gree	China	48	13.11	17	3	14	
15	Midea Group	China	57	13.65	16	12	13	
16	Hisense	China	1	13.69	13	16	17	
17	Blue Star Ltd	India	0.6	14.54	18	11	15	
18	Chigo ⁽ⁱⁱⁱ⁾	China	0.05	15.02	15	18	18	

Weighting

(i) Weighted ranks are calculated for each area. We display non-weighted ranks in this summary for simplicity only.

(ii) Blue Star, Chigo, Gree, Haier, and Hisense were not requested to respond to CDP's 2019 climate change questionnaire.

(iii) Carrier Market Cap as of June 2020. As of May 15 2020, Chigo has been suspended from trading on the HKSE.

Source: CDP

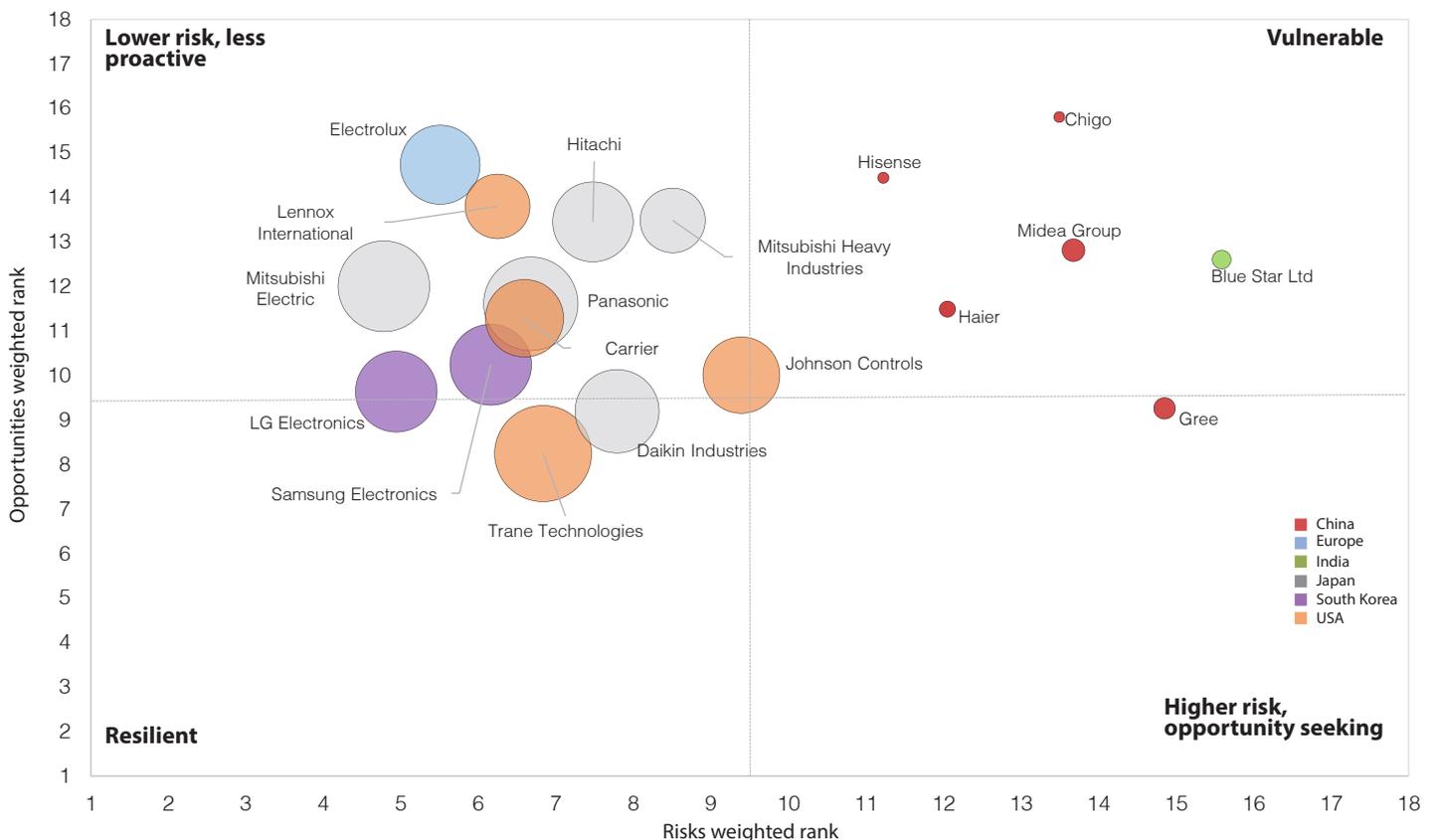
40%

30%

30%

- HVAC & Refrigeration
- Industrials & Engineering
- Electronics & Automation
- Building Services
- Home appliances
- IT & Communication
- Transport & Energy
- Other

Figure 2: Opportunity vs. risk for low-carbon transition



Bubble size: Larger bubble size = stronger performance on climate governance & strategy

Source: CDP

Pathway to zero for the cooling sector

The next round of international climate negotiations is planned for COP26 in 2021 and needs to accelerate our collective efforts on the pathway to a healthy, resilient, zero emissions future. In addition to national commitments, crucial contributions are also needed from real economy actors. We know that cooling is one of the key sectors where deep transformation is most needed.

The findings in this report highlight the availability of climate-friendly air-conditioners and refrigerators, but there is a significant gap between what is technically possible and current minimum energy efficiency standards. However, with a radical step-change in efficiency standards, innovation and R&D, the cooling sector can make a valuable contribution to reducing emissions.

The cooling market is valued at around US\$300billion. There is a huge opportunity for cooling businesses to innovate, compete and find economies of scale – serving the cooling needs of people all over the world. And in response to the economy wide call to action for zero emissions commitments for COP26, cooling companies have an opportunity to build on their incremental climate performance to date, as assessed in this report, and to position the sector at the forefront of climate action. The world looks forward to climate-friendly cooling for all who need it, and to the multiple benefits for health, recreation and productivity that the cooling sector provides.

Nigel Topping,
COP26 High Level Climate Action Champion

Emissions reduction targets

Figure 3: Scope 3 - Use of Sold Products targets

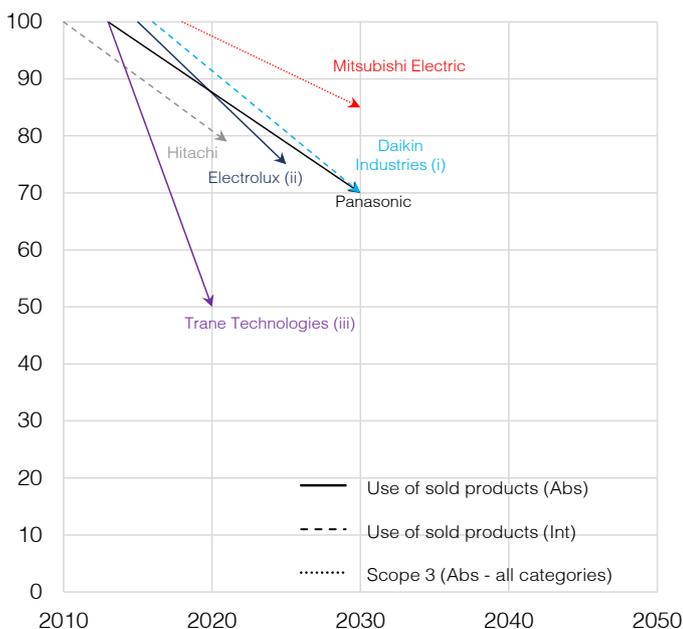
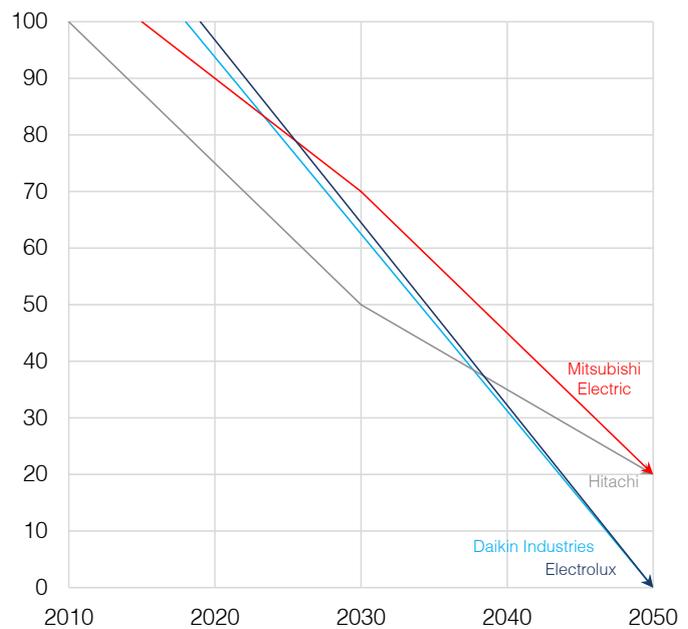


Figure 4: Scope 1, 2 & 3 emissions reduction targets^(iv)



Note: Base year indexed to 100

(i) Daikin Industries' target includes both Use of Sold Products and End of Life Treatment of Sold Products.

(ii) Electrolux's target covers three-quarters of all products sold by the company.

(iii) Trane Technologies' target includes the impact related to the refrigerant used in its products only, which is 10% of the total impact of the company's products during use phase. The company has achieved this target and will be submitting its new 2030 targets, which include reducing emissions from the use phase of its products, for review as a Science Based Target this year.

(iv) Company targets cover the full value chain, with no detail of Scope 3 categories specified and therefore all are assumed to be included.

Companies committing to net zero emissions throughout their value chain by 2050 may include an offsetting element.

Source: CDP, company reports

CDP Investor Research

CDP UK

Carole Ferguson

Head of Investor Research,
+44 (0) 20 3818 3956
carole.ferguson@cdp.net

Luke Fletcher

Senior Analyst,
+44 (0) 20 3818 3951
luke.fletcher@cdp.net

Ling Sin Fai Lam

Senior Analyst,
+44 (0) 20 3818 3936
ling.sinfailam@cdp.net

Tom Crocker

Analyst,
+44 (0) 20 3818 3935
tom.crocker@cdp.net

Kane Marcell

Analyst,
+44 (0) 20 3818 3956
kane.marcell@cdp.net

Alice Newman

Analyst,
+44 (0) 20 3818 3936
alice.newman@cdp.net

Emma Amadi

Analyst,
+44 (0) 20 3818 3936
emma.amadi@cdp.net

Jinxi Chen

Analyst,
+44 (0) 20 3818 3935
jinxi.chen@cdp.net

CDP

Plantation Place South
60 Great Tower Street
London EC3R 5AZ
United Kingdom

Tel: +44 (0) 203 818 3900

@cdp
www.cdp.net
info@cdp.net

CDP contacts

CDP UK

Frances Way

Chief Strategy Officer

Claire Elsdon

UK Associate Director,
Investor Initiatives
+44 (0)203 818 3928
claire.elsdon@cdp.net

Sebastian O'Connor

Senior Account Manager,
Investor Initiatives
+44 (0) 20 3818 3900
sebastian.oconnor@cdp.net

CDP North America

Emily Kreps

Head of Investor Initiatives,
+1 646 517 6470
emily.kreps@cdp.net

Radhika Mehrotra

Manager, Investor Initiatives,
+1 646 517 6471
radhikamehrotra@cdp.net

CDP Europe

Laurent Babikan

Director of Investor Engagement,
+33 658 66 60 13
laurent.babikan@cdp.net

Torun Reinhammar

Senior Account Manager,
Investor Engagement
+46 (0)705 365903
torun.reinhammer@cdp.net

Matteo Brezza

Account Manager,
Investor Engagement,
+49 30629033120
matteo.brezza@cdp.net

CDP Japan

Kyoko Narita

Senior Account Manager,
Investor Initiatives
+81 (0)3 6869 3928
kyoko.narita@cdp.net

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Katherine Garrett-Cox (Chair)**Annise Parker****Christine Loh****Jane Ambachtsheer****Jeremy Burke****Jeremy Smith****Justin Johnson****Martin Wise****Rachel Kyte****Ramakrishnan Mukundan****Sonia Medina****Stephen T Chow****Takejiro Sueyoshi****David Wolfson**

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