

Israel's State of Climate Tech 2023

Innovating towards
a better planet

Contributors



PLANETech

PLANETech is a nonprofit climate tech innovation community – a joint venture of the Israel Innovation Institute and Consensus Business Group. PLANETech aims to lead the Israeli and global climate tech ecosystem in tackling climate change via a combination of approaches. This is done by modifying business focus and technologies towards climate change challenges, supporting the deployment and implementation of innovative climate technologies, and by building a global network for climate tech innovators while promoting Israel as a world center for climate change technologies.



Israel Innovation Authority

The Israel Innovation Authority, an independent publicly funded agency, was created to provide a variety of practical tools and funding platforms aimed at effectively addressing the dynamic and changing needs of the Israeli Tech hub. Its target audience includes early-stage entrepreneurs, mature companies developing new products or manufacturing processes, academic groups seeking to transfer their ideas to the market, global corporations interested in collaborating with Israeli technology, Israeli companies seeking new markets abroad, and traditional factories and plants seeking to incorporate innovative and advanced manufacturing into their businesses.

The report was written by Dr. Tamar Moise of PLANETech and Dr. Hagit Schwimmer of the Israel Innovation Authority.

Special thanks to all team members for their contribution in bringing this report to fruition – Noam Sonnenberg, Adi Graison, Liz Betsis, Talya Herring, Gal Sharon, Deborah Kreis, Shani Zanesco, Hanan Brand, Noa Yaffe, Noga Carmin and Maayan Bohak.

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Foreword

In 2021, PLANETech, a non-profit climate tech innovation community and the Israel Innovation Authority – an established government agency – collaborated in the very first nation-wide evaluation of any country's climate tech ecosystem, culminating in the writing of the first "Israel's State of Climate Tech" report.

This report had multiplying effects, not only documenting the existing ecosystem, but also forging a climate tech identity for Israeli entrepreneurs and motivating the various players that collaboratively promote and drive innovation, towards developing and accelerating Israeli climate tech.

The same year, the Israeli government undertook to globally promote Israel's climate tech capabilities, building upon its designation as a "Startup Nation" to fulfill the role of "Climate Tech Nation", and endorsing Israel as "The Climate of Innovation",¹ a hub for the development of climate change mitigation and adaptation technologies.

Our previous "State of Climate Tech" annual reports, published in 2021 and 2022, provided an overview of Israel's climate tech innovation ecosystem. The reports mapped the companies that are developing mitigation and adaptation technologies, monitored their funding, analyzed the growth of the Israeli climate-tech ecosystem over recent years, and portrayed the ecosystem's evolution in the context of global climate-tech development – thereby delineating the ongoing pathway to becoming a "Climate Tech Nation".

As presented in the reports, Israel possesses the capability and the potential to contribute substantially to global efforts against climate change. Increased propagation, adoption and deployment of Israeli climate technologies, both nationally and globally, would further increase Israel's internal and global contribution to emission reduction commitments and adaptation solutions.

This current 2023 report continues the tradition of providing the most up-to-date depiction of the Israeli climate tech ecosystem. We also initiate the first analysis of Israeli climate-tech innovations' global deployment, a first step in assessing Israel's global impact on both mitigation and adaptation across sectors, geographies, natural ecosystems, and populations, and assessing the realization of Israel as a Climate Tech Nation.

At the time of this report's publication, the Israel high-tech sector is adapting to the current security situation and its implications. Among the significant factors contributing to the strength and accomplishments of Israel's innovation ecosystem is its flexibility and agility. This, together with the cohesiveness of the ecosystem, ensures that the local high-tech sector is forging ahead, even under these circumstances. In particular, Israeli climate-tech, with its dual missions of planetary and economic prosperity, continues to actively advance both these missions along its global value chain, despite any transient challenges that arise.



Dror Bin
CEO of Israel Innovation Authority



Noam Sonnenberg
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¹ The motto of Israel's first ever pavilion at COP27 in Sharm El Sheikh, 2022.



Executive Summary

The goal of transitioning to a net-zero and climate-positive economy has spurred multilateral collaborative endeavors, infrastructure planning, private and public funding, and promises of business opportunities worth trillions of dollars. The significant financial returns, together with the urgency of the climate crisis itself, means that climate tech is a rapidly maturing asset class, with increasing involvement of multiple stakeholders developing, financing, and deploying incremental and disruptive climate tech solutions.

Israel's climate tech ecosystem mirrors the global climate tech acceleration and continues to grow and escalate. The number of Israel's climate-tech startups, mapped according to the PLANETech Climate Challenge Map, increased both in absolute numbers, reaching 784 startups, and as a growing proportion of all new startups founded each year, comprising 17% of these in 2022, meaning that 1 out of every 6 new startups is climate tech. Most of the startups, approximately 66%, are less than 7 years old. Over 55% of all funded startups are at the pre-seed or

seed stage. Most – approximately 80% – have hardware at the core of their innovation (either exclusively hardware or combined with software).

The five most prolific climate challenges addressed by the startups founded since 2018 are Climate Smart Agriculture, Clean Energy Systems, Sustainable Mobility & Transport, Alternative Proteins, and Carbon Management, Risk & Finance. When relating to the larger and older full set of Israeli startups, the fifth most prolific challenge addressed is

Eco-Efficient Water Infrastructure, highlighting that this challenge is typically addressed by more mature companies. The first four challenge areas are also those whose startups have collectively raised the highest investments each year since 2018.

Carbon Management, Risk & Finance and Carbon Capture and Storage are the two challenge areas with the highest fraction of new startups established in the last 3.5 years, although they are yet to raise significant funds. The challenge area that displays the most rapid growth, both in terms of the number of newly established startups and the funding raised is Alternative Proteins. Green Construction, a challenge that was classified in the rapid growth cluster in 2021 and 2022, now displays a dearth of new startups and, together with Clean Manufacturing and Sustainable Digital Infrastructure, is classified under stagnated growth – challenge areas with very few new startups yet well above the median of total investments per climate challenge. Compared to previous years, we see slight shifts in numbers and investments within the cluster of early growth; challenges such as Circularity, Food Loss & Waste and Novel Materials, all with less than 50 startups and a notable growth rate of newly established startups.

The total amount invested in Israeli climate tech startups between 2018 – H1 2023 totaled \$8.2 billion, with \$2.3 billion raised in 2022 alone. **For every investment dollar raised in Israeli high tech in 2022, 14 cents went towards climate tech.**

Investors originate in roughly equal proportions from Israel and other non-Israeli localities among which

those from the US were predominant. Over 50% of the investments were raised from VC investors, followed by investments from CVC's (16%), that are nearly entirely non-Israeli entities. The trends observed for investments in Israeli climate tech startups generally mirror the global trends. Between 2018-2021, Israeli climate tech investments followed the global trend of growth, although financing in Israel grew by 320% – outpacing global growth by a factor of 2.6. During the global economic slowdown of 2022, Israeli climate tech was highly resilient, raising investments at levels close to those of 2021, again similar to the global patterns, demonstrating stability in the total amounts of climate tech investments in 2021 & 2022. **Climate tech was 400% more resilient than the general Israeli tech ecosystem where investments declined significantly in 2022.** Again, similar to global trends, investments in the first half of 2023 dropped significantly compared to the parallel period in 2022. The mirroring of the global trends would seem to be a sign of the mainstreaming of Israeli climate tech ventures.

Government support from the Israeli Innovation Authority for climate tech ventures across all stages, from academic research to pilots and scale-up, totaled \$71.4 million in 2022, comprising 16% of its annual budget. Other governmental ministries and agencies support climate tech in academic research, pilots, and technological developments.

A survey conducted among Israeli climate tech startups revealed that **the main challenges faced by the startups are financing, market scale-up opportunities, and regulatory hurdles.** Pre-seed and seed companies

specifically point out the lack of pilot site opportunities. The capability of scale-up and regulatory hurdles were more dominant for startups at round B and beyond. A higher fraction of respondents cited scale up as a barrier compared to our survey in 2021 (40% vs. 28% in 2021), a finding that may demonstrate the maturing of the ecosystem.

Responses from the survey demonstrate that Israeli innovations are deployed worldwide, across all continents, and in well over 100 countries. Moreover, 20% of the startups do not deploy their innovation within Israel. **Over 20% of the startups are active in at least 10 countries and over 75% are active in North America as well as in Europe.** The leading North American market is the USA while the leading European markets are Germany, Italy, and Spain. In Latin America, Asia and Africa the leading markets are Mexico and Brazil, India, and South Africa respectively. The Australian market penetration is similar to that of the leading Latin America countries.

The collaborative approach to innovation in Israel that integrates multiple stakeholder types, especially within the climate tech ecosystem, has accelerated and amplified the ecosystem over these last years. The government's focus on climate tech alongside new climate tech investment funds and verticals, the proliferation of new venture builders, accelerators and incubators, amplified focus in academia on technological solutions for climate and top talent moving into climate tech, will all undoubtedly continue to drive the Israeli climate tech ecosystem to greater heights and success with growing global impact in the coming years.

ISRAEL CLIMATE TECH ECOSYSTEM AT A GLANCE



784

Israeli
climate tech
startups



\$2.3B

funding for
Israeli
climate tech
in 2022



1 out of 6

Startups
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14 cents

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01

Introduction

Addressing the climate crisis and limiting warming to 1.5°C requires system-wide transformation; involving technology, infrastructure, governance and climate finance.

Surveying global endeavors to tackle the climate crisis during the past year since the publication of our report “Israel’s State of Climate Tech 2022 Update” reveals deepened global commitments and actions on all the above fronts, involving both private and public sectors. Nevertheless, it is apparent that these actions fall short and that change, although heading in the right direction, is occurring at insufficient speed. In order to attain the 1.5°C limit with no or limited overshoot, swift and significant efforts must be made to reduce greenhouse gas emissions by 43%² by 2030.³

The Synthesis Report of the IPCC Sixth Assessment Reports (AR6) emphasizes the need for finance, technology and international cooperation as critical enablers for deep emission reductions and climate resilience. The report outlines how emissions cuts can be achieved and establishes carbon dioxide removal (CDR) methods as

unavoidable to achieve net zero CO₂ or GHG emissions, as a proposed pathway to attaining the 1.5°C limit.

As the effectiveness of adaptation measures to reduce climate risk declines with increased warming, reducing adaptation gaps (the differences between what is being done and what is needed) and avoiding maladaptation must be given immediate priority.³ A major breakthrough at COP27 was the establishment of a Loss and Damage Fund to aid developing countries to respond to and recover from the devastating impacts of climate change, for which the scope and financing is to be finalized at COP28. Likewise, the Global Goal on Adaptation framework, intended to establish processes for evaluating the effectiveness of adaptation interventions, is due to be finalized by COP28.

According to the International Energy Agency, nearly half the low-carbon technologies required to reach net-zero by 2050 have yet to be developed or are unavailable commercially.⁴ Both private and public funding are crucial to development and deployment of scalable technological solutions. In the US, federal spending programs, especially the Inflation

² Emission reductions are relative to 2019.

³ Synthesis report of the IPCC Sixth Assessment Report, March 2023.

⁴ Net Zero by 2050, A Roadmap for the Global Energy Sector, IEA, October 2021.



Reduction Act (IRA), have accelerated private sector-led and government-enabled projects in energy and industry, as well as providing incentives for development and deployment of earlier-stage emerging climate technologies such as clean hydrogen, sustainable aviation fuel and direct air capture (DAC). Two commercial-scale DAC facilities were recently announced as part of the Department of Energy's (DOE) Regional Direct Air Capture Hubs Program.⁵ These federal programs provide a strong signal for increased allocations to support continued growth of emerging and mature climate technologies, and are expected to have far-reaching and substantial impact on both US and non-US emission reductions.⁶

The EU and member states have also accelerated programs for public and private financing to attain decarbonization targets, including innovation in industry, buildings, and clean energy – the latter given extra impetus following the outbreak of the Russia–Ukraine war, in response to the EU's need to achieve energy independence and overcome supply disruptions and volatility.

In the private sector, the growth of climate tech innovations is facilitated by the anticipated continued strong growth of the climate tech market,⁷ an increasing number of new players, and the diversification of finance across industries. In 2022, thousands of investors participated in at least one climate deal,⁸ and funds raised by climate-focused VCs continued to increase, although the VC dollars invested remained similar to 2021 – approximately \$40B.⁹ This stability demonstrated the resilience of climate tech during a slowdown in global investments in the wake of the post-Covid recession. In contrast, the first half of 2023 has shown a downturn in capital flow to climate tech. Interestingly, both funding and the number of early-stage deals increased in 2022 and in H1 2023 compared to previous years, and the turndown emanates from a slowing in growth-stage capital and deal numbers (which have typically been dominated by Energy and EV startups). It will be interesting to see the funding outcomes for the second half of 2023 and to monitor, not only the funding stage of companies successfully raising capital, but also the strategies undertaken to facilitate growth capital to the

VC dollars invested globally in climate tech in 2022 remained similar to 2021 – approximately \$40B. This stability demonstrated the resilience of climate tech during a general slowdown in global investments

broader set of mitigation and adaptation (non-energy/EV) technologies as these develop.

Alongside the climate crisis, the ecological crisis has also received more attention this past year. The Kunming-Montreal Global Biodiversity Framework (GBF), adopted at COP15, establishes a package of measures critical to addressing the loss of biodiversity and restoring natural ecosystems,¹⁰ the EU Parliament passed its Nature Restoration Law,¹¹ and The Science-Based Targets Network is piloting the first formal framework to help companies set goals for preserving nature and biodiversity.¹² These frameworks require scaling of nature-based solutions – involving not only financing but also, the development of nature technologies that can enable, accelerate, or scale-up nature-based solutions. This is a still nascent domain, with VC investment of approximately \$2B in 2022, a figure that is expected to grow to \$6B by 2030.¹³

Amidst these global developments and financing opportunities related to climate and nature goals, this report continues the tradition of our 2021 and 2022 “Israel's State of Climate Tech” reports in providing an up-to-date analysis of developments in Israeli climate tech. Israel is acknowledged as an emerging global climate tech hub,¹⁴ with an ecosystem consisting of government, startups, and investors as well as a surge of newly-founded accelerators, incubators, and programs designed to support startups at different stages of their growth. This 2023 review of “Israel's State of Climate Tech” will, like our previous reports, undoubtedly play a crucial role in driving awareness, knowledge, and strategic decision-making towards the continued growth and success of Israel's climate tech industry.

5 <https://www.energy.gov/articles/biden-harris-administration-announces-12-billion-nations-first-direct-air-capture> - retrieved August 11, 2023.

6 <https://rhg.com/research/taking-stock-2023/> - retrieved August 13, 2023.

7 Pitchbook, Carbon & Emissions Tech Launch Report, September 2022.

8 CTVC, Who are the climate tech VCs? May 5, 2023.

9 Pitchbook and CTVC.

10 <https://www.unep.org/news-and-stories/story/cop15-ends-landmark-biodiversity-agreement>

11 https://cinea.ec.europa.eu/news-events/news/new-nature-restoration-law-boosts-biodiversity-and-climate-action-across-europe-2023-07-12_en

12 <https://sciencebasedtargets.org/about-us/sbtn>

13 The Nature Tech Market, Nov 2022, Capital for Climate and Nature4Climate.

14 Scaling Climate Tech, A Global Study of Entrepreneurs and Networks, Endeavor Insight and HSBC, October 2022.



02

Methodology

Climate tech companies are mapped according to the relevant climate challenges addressed by their innovation. The methodology section begins by describing the PLANETech Climate Challenge Map and then details the compilation of the database used for the analysis and the mapping procedure.

Complementary information was also collected directly from climate tech startups through a survey circulated especially for this report.

PLANETech Climate Challenge Map

The PLANETech Climate Challenge Map presents the main challenges to successful climate change mitigation and adaptation, across all activities of our daily life and natural ecosystems. The 22 challenges are distributed across five climate challenge areas: The Built Environment, Materials & Manufacturing, Land Use, Nature, and Digital (Figure 1). Each of the 22 challenges encompass explicit sub challenges.¹⁵

The challenges target the reduction of emission sources, enhancement of carbon sinks, as well as community, nature, and infrastructure resilience. Innovative solutions based on diverse technologies can provide a response to any specific challenge.

The PLANETech Challenge Map provides a common platform for the Israeli climate tech ecosystem by aligning startups, directing finance, and providing context for policymakers. It

has also been adopted by the European Institute of Innovation and Technology (EIT) in their mapping of four European climate tech ecosystems.

Mapping of Climate Tech Startups

The database compiled for the mapping presented in the report is based on the database used for mapping the ecosystem in 2022.¹⁶ Startups were included in the database if one of their products or services addresses at least one of the PLANETech climate challenges.

The database includes companies founded since 2003 that have raised investments, as well as young companies founded less than 7 years ago, that have yet to raise funding. The 2022 database was revised to exclude older companies and startups that have since closed or are now inactive. Startups added to the database were those established since the last report, not previously identified, or startups that have pivoted to include a climate agenda in their core business.

Investment data was taken from IVC, Crunchbase, and Start-Up Nation Central. Investment amounts were extracted for each company's completed funding rounds together with the investors' identity, type (e.g. angel, VC) and headquarters' location.

A startup's innovation, be it a product, service, or a platform, may address numerous challenges, however, the analysis presented in this report relates to a startup's main challenge.

¹⁵ Details on each of the climate challenges and sub-challenges can be found at <https://www.planetech.org/challenge-areas>

¹⁶ [State of Israel's Climate Tech, 2022](#)

Challenges are designated by the sector attribution of the innovation, it's functionality, the technology it is based on, how and where it is applied, and (in the case of material products) how it is generated.

The PLANETech Startup Platform presents Israeli climate tech startups and displays the relevant climate challenges each one addresses.¹⁷

FIGURE 1 | PLANETech Climate Challenge Map

Built Environment



Clean Energy Systems



Sustainable Mobility & Transport



Low Carbon Buildings



Green Construction



Eco-Efficient Water Infrastructure

Materials & Manufacturing



Novel Materials



Clean Manufacturing



Circularity



Transparent & Agile Supply Chains



Carbon Capture & Utilization

Land Use



Climate Smart Agriculture



Soil Health



Alternative Proteins



Food Loss & Waste



Metal & Mineral Mining

Nature



Forests & Land Ecosystems



Oceans & Water Ecosystems



Extreme Weather Events



Biodiversity



Earth Observations

Digital



Sustainable Digital Infrastructure



Carbon Management, Risk & Finance

¹⁷ <https://www.planetech.org/startups-platform>



03

Israel's Climate Tech Startups

Climate Tech Startups by Climate Challenge

The updated mapping of Israeli startups identified a total of 784 startups that offer solutions to climate challenges, an increase of 90 startups compared to the 694 climate tech startups identified in 2022.¹⁸ Figure 2 shows the distribution of the startups according to the main climate challenge they address.

The five most prolific challenges addressed by the startups are the same as those in the 2022 report: Climate Smart Agriculture, Clean Energy Systems, Sustainable Mobility & Transport, Alternative Proteins, and Eco-Efficient Water Infrastructure – with 137, 136, 78, 66 and 56 startups, respectively.

When conducting a similar mapping exercise exclusively for startups established since 2018 (382 startups, comprising 49% of all startups), we noted some changes in the positioning of the different climate challenges (Figure 3).

Carbon Management, Risk and Finance as well as Carbon Capture and Utilization rank significantly higher, reflecting the increase in startups addressing these two challenges in more recent years. In contrast, the Eco-Efficient Water Infrastructure challenge ranks much lower and Low Carbon Buildings no longer features in the leading 10 challenges – indicating that startups addressing these two challenges are now primarily mature companies.



784
Israeli
climate
tech
startups

¹⁸ [State of Israel's Climate Tech, 2022](#)

FIGURE 2 | All Climate Tech Startups by Main Challenge Area

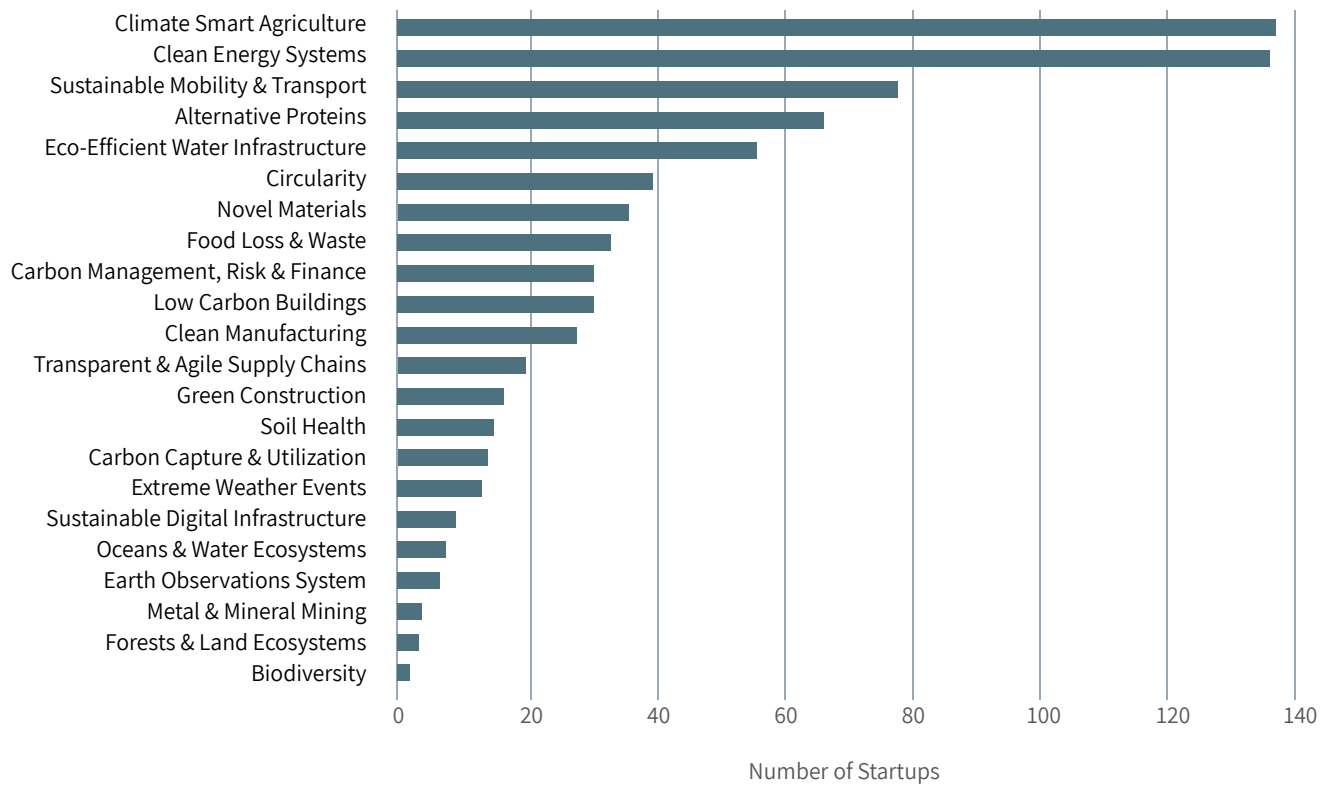
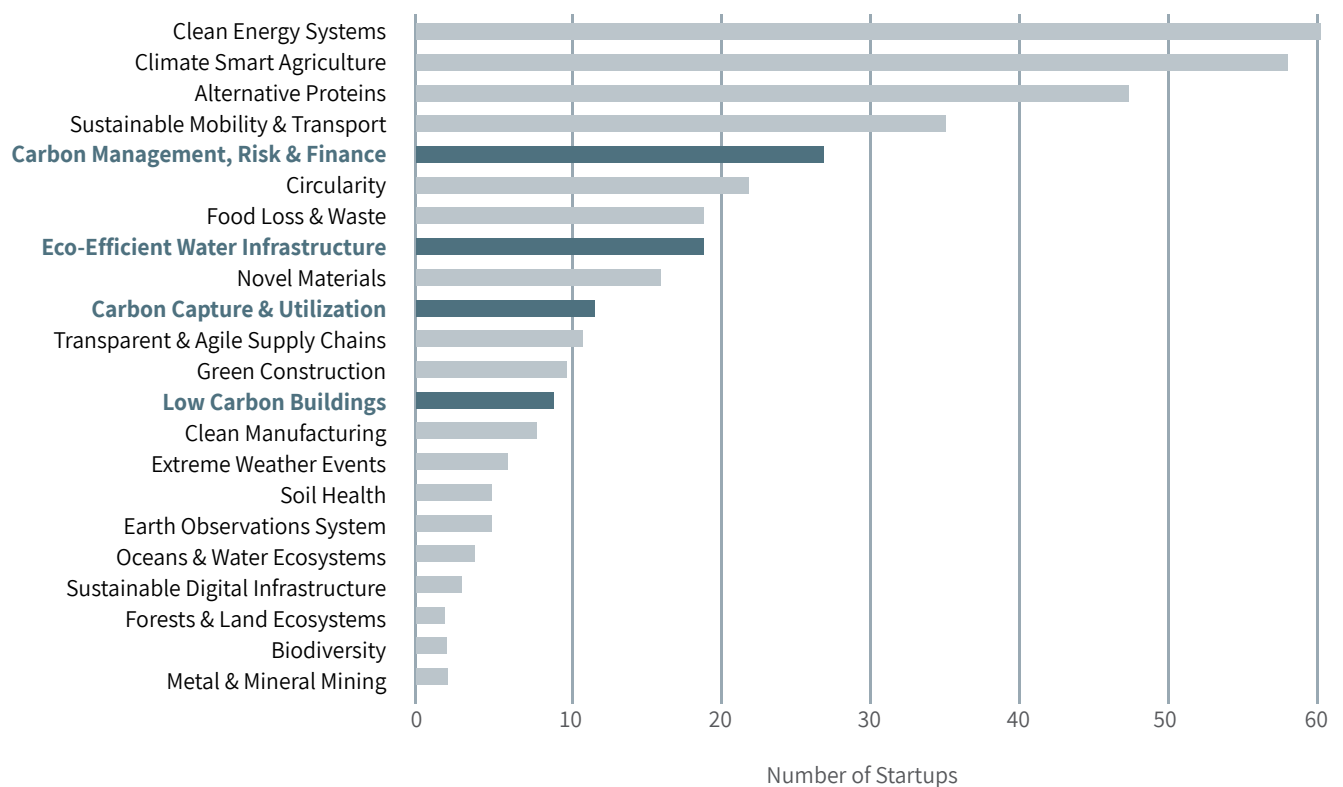


FIGURE 3 | Climate Tech Startups Established Since 2018 by Main Challenge Area


The darker shaded bars are challenges ranked significantly differently when compared to the full set of startups (see Fig. 2)



Israel's Climate Tech Startups

Growth of Climate Tech Startups Compared to All Tech Startups

Our 2021 and 2022 reports have already showed that climate tech startups comprise an increasing proportion of all newly established Israeli startups each year. The ratios presented for any given year differ slightly from those in the previous reports due to amendments in the documentation of the total number of startups founded in recent years,¹⁹ as well as additions to the database of previously unidentified climate tech startups. The trend here is, however, identical, with a consistent yearly growth in the ratio of climate tech startups out of all startups established, and a striking increase in the last 2 years (Figure 4). In 2022, climate tech startups comprised 17.4% of all newly established tech startups, i.e., one out of every six new tech startups is a climate tech startup.

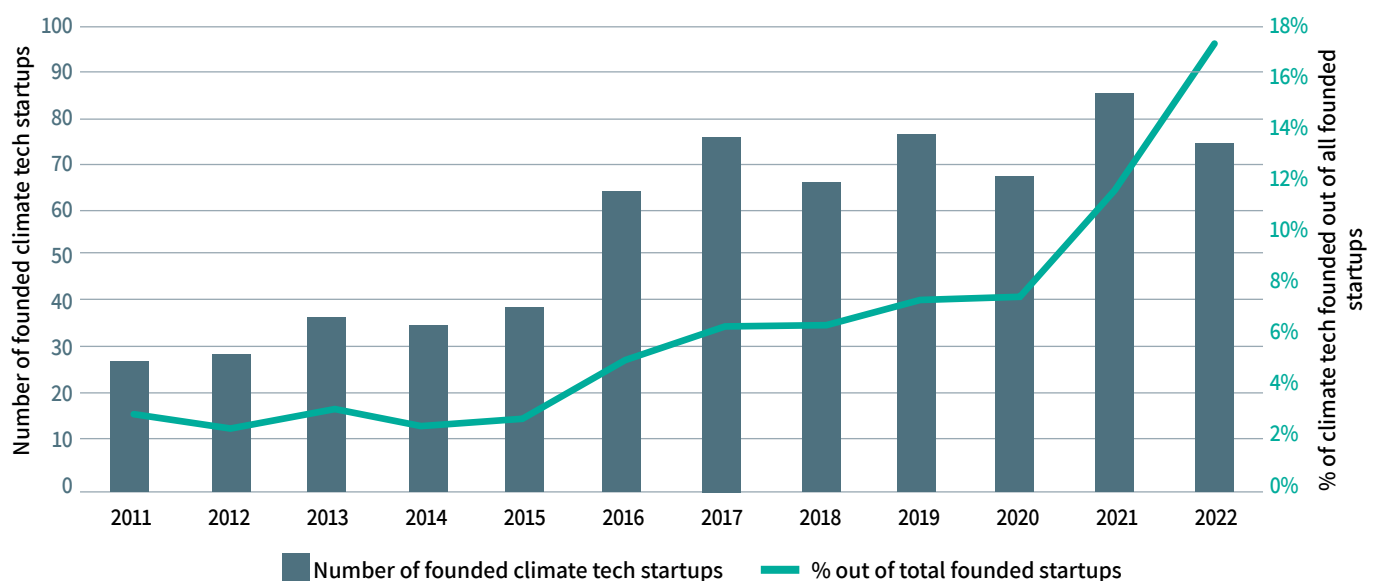


1 out of 6
startups
established
in 2022 are
climate tech

This high ratio is despite the slightly lower number of climate tech startups established in 2022 compared to 2021 and reflects an even greater decline in the total number of startups established that year compared to previous years. This indicates that climate tech innovation is perceived as an opportunity and to be less susceptible to the ongoing decline in the numbers of newly established Israeli startups.

” Climate tech innovation is perceived as an opportunity and is less susceptible to the ongoing decline in the numbers of newly established Israeli startups

FIGURE 4 | Climate Tech Startups by Year Established



¹⁹ IVC -LeumiTech Israeli Tech Review Q1/2023.

The Emergence of New Climate Tech Startups by Climate Challenge

To better understand the emergence of new climate technologies on a yearly basis we mapped the new startups established each year by their climate challenge. Figure 5 shows the 8 challenges with the highest cumulative number of startups over the period 2018-2022.

- These 8 challenges comprise between 63%-80% of all the startups established each year.
- Clean Energy Systems and Climate Smart Agriculture startups are the dominant challenge areas of new startups each year. Clean Energy startups show a steady increase in the ratio (and number) of new startups each consecutive year – even when the total numbers decline. In contrast, Climate Smart Agriculture startups show a decline in the ratio (and number) each year – although 2022 again shows an increase.
- Alternative Proteins and Sustainable Mobility & Transport are the next leading challenge areas – with the number of new startups established varying each year.
- Startups addressing the Carbon Management Risk and Finance challenge emerge again in 2020, growing to prominent numbers in 2021 and 2022.

The four leading challenge areas addressed by new climate tech startups are



Clean Energy Systems



Sustainable Mobility & Transport

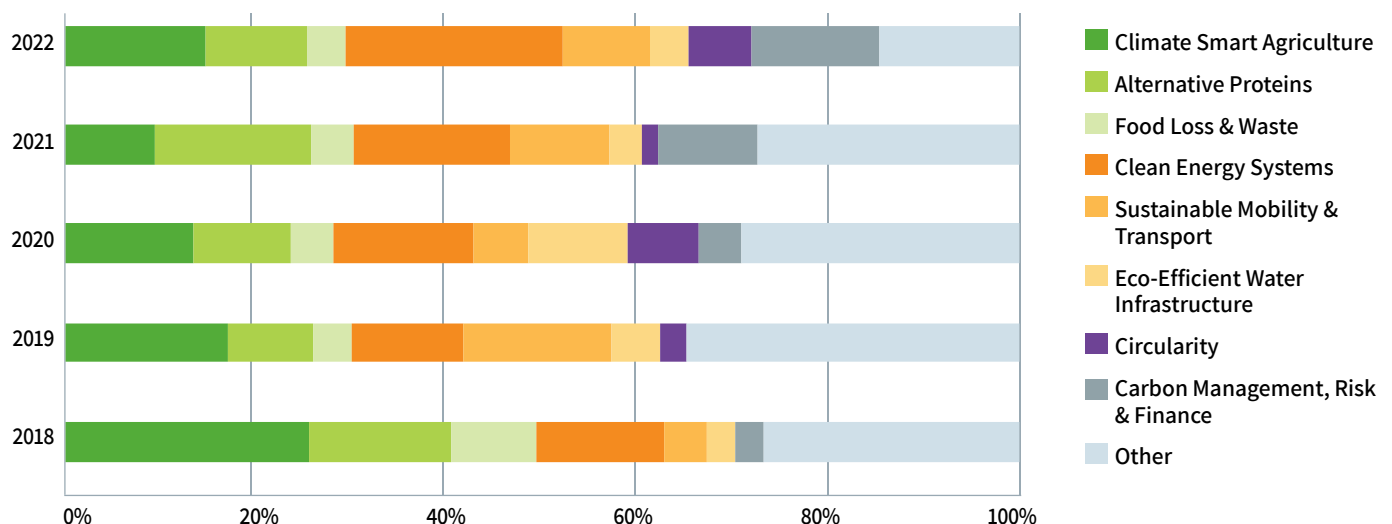


Climate Smart Agriculture



Alternative Proteins

FIGURE 5 | Ratio of New Startups by Climate Challenge





Growth Map of Climate Tech Domains

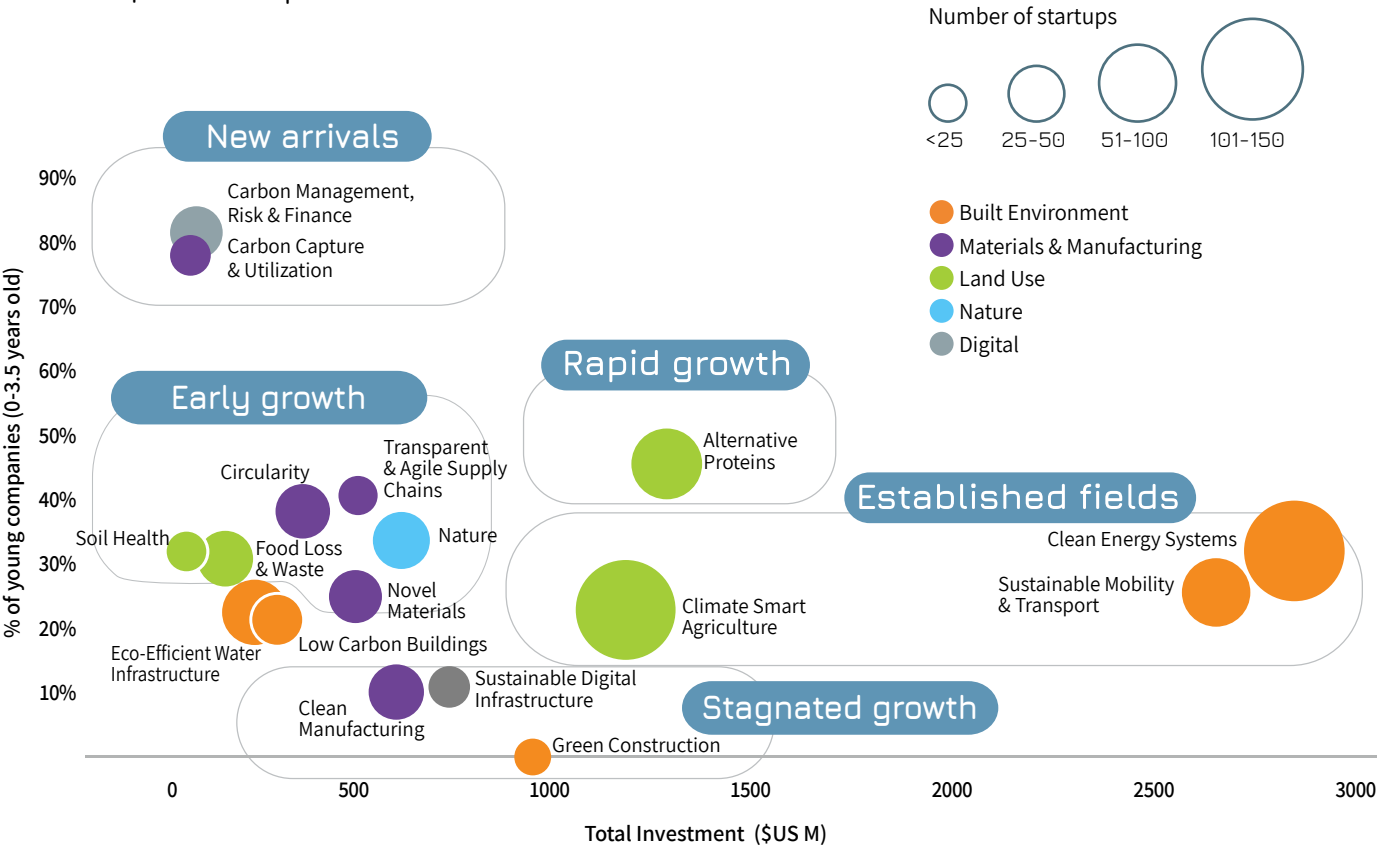
An analysis of startup companies’ growth rate for each specific challenge is shown in Figure 6. The figure depicts the percentage increase in the number of startups over the last 3.5 years (2020-H1 2023), the size bracket of the total number of startups for each challenge, and the total known investment per challenge.

The challenges are grouped into a number of clusters, each defined by common characteristics. Cluster 1 – Established Fields – consists of Sustainable Mobility & Transport, Clean

Energy Systems, and Climate Smart Agriculture. These challenges have the highest number of startups, the largest total funding over time, and steady investment growth. We note that the relative increase of 20%-30% in young startups in these challenges actually dominates the newly established climate tech startups with regard to absolute numbers each year (Figure 5).

The challenge of Alternative Proteins is the only one in Cluster 2 – Rapid Growth. It shows that a large proportion of the existing companies are young and that significant capital has been raised.

FIGURE 6 | Growth Map of Climate Tech Domains



It is noteworthy that in our 2021 and 2022 reports, Green Construction was also attributed to the Rapid Growth cluster, leading us to anticipate this challenge's continued growth. However, despite the entry of new and disruptive startups in the past, we did not identify the establishment of any new startups with Green Construction as their main challenge in the last 3.5 years. Green Construction is now in Cluster 3 – Stagnated Growth – alongside Clean Manufacturing and Sustainable Digital Infrastructure, challenges with very few new startups yet well above the median of total investments per climate challenge. These challenges are central to decarbonization, and opportunities could abound if entrepreneurs seize the opportunity and investors follow suit.

Cluster 4 – Early Growth – includes a group of challenges, each with less than 50 startups at varied stages of maturity and for which investment growth is still limited. Here, we include aggregated data for the Nature challenges.²⁰

Cluster 5 – New Arrivals – includes Carbon Management, Risk & Finance, and Carbon Capture & Utilization, two challenges that have attracted entrepreneurs in line with the global interest in these domains, and in which opportunities are expected to grow. Both challenges include a very high percentage of young companies, with a larger number of startups emerging in the software-based Carbon Management, Risk & Finance platforms (see also Figure 5) compared to the hardware-intensive Carbon Capture & Utilization challenge. Both challenge areas are still at an early stage of investment.

The Onset of Growth for Climate Tech Startups

While the Israeli climate tech domains are at different stages of growth, the majority of the startups (67%) are less than 7 years old, with nearly even distribution between the three age subgroups, the largest fraction being between 4-7 years old (Figure 7a).

As expected, the older the company, the higher the fraction of larger size companies. The size bracket of 11-50 employees increases from 14% to 28% to 36% when progressing across the three age groups and the size bracket of 51+ employees increases from 4% for the younger companies (up to age 7) and then increases to 17% for companies older than 8 years old (see Figure 7a). Nevertheless, the data shows that 66% of all companies have less than 10 employees (Figure 7b), and that the majority of these smaller sized companies (50% of all startups) are aged 7 and lower. This emphasizes the long development period and late onset of growth for climate tech companies.

FIGURE 7a | Climate Tech Startups by Size and Age

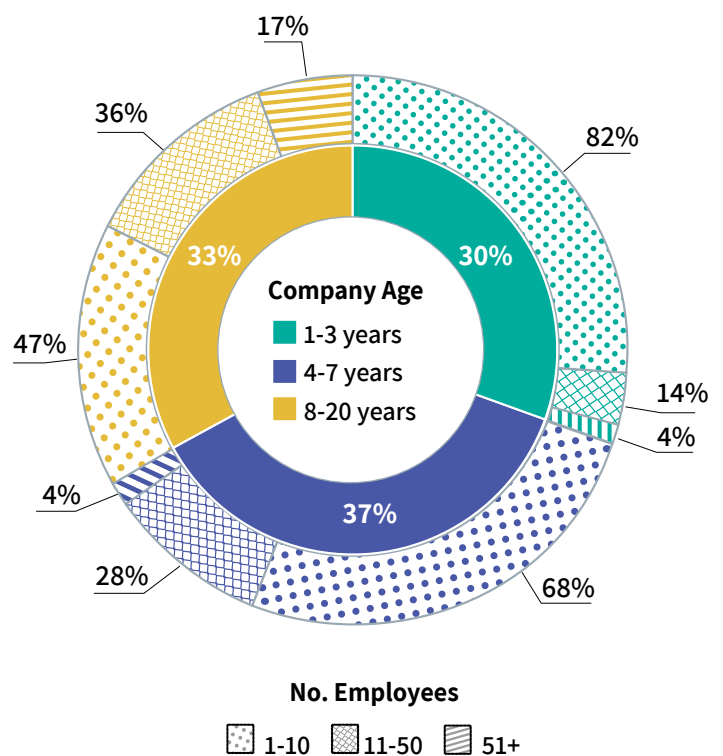
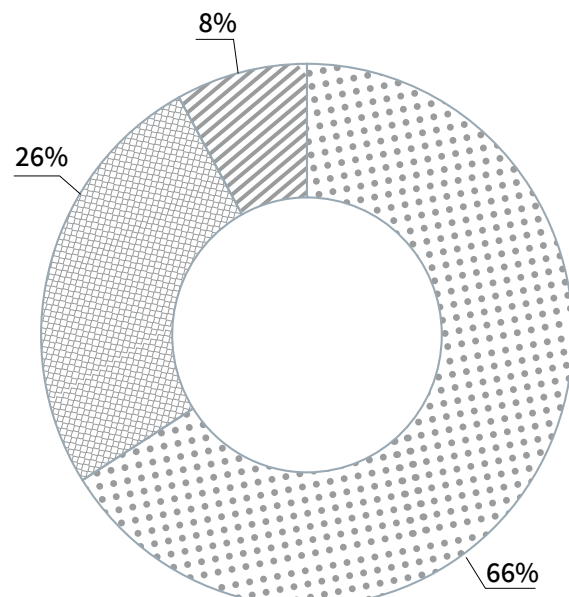


FIGURE 7b | Climate Tech Startups by Company Size



The majority of startups (67%) are less than 7 years old

²⁰ The Nature challenge area includes the following 5 challenges: Forests and Land Ecosystems, Oceans and Water Ecosystems, Extreme Weather Events, Biodiversity and Earth Observation Systems.

Israel's Climate Tech Startups

Capital Investments

Investments in Israeli climate tech ventures totaled \$8.2B between 2018-H12023 (Figure 8). Climate tech investments in 2022 totaled \$2.27B, and in the first 6 months of 2023 (H1 2023) totaled \$551M.

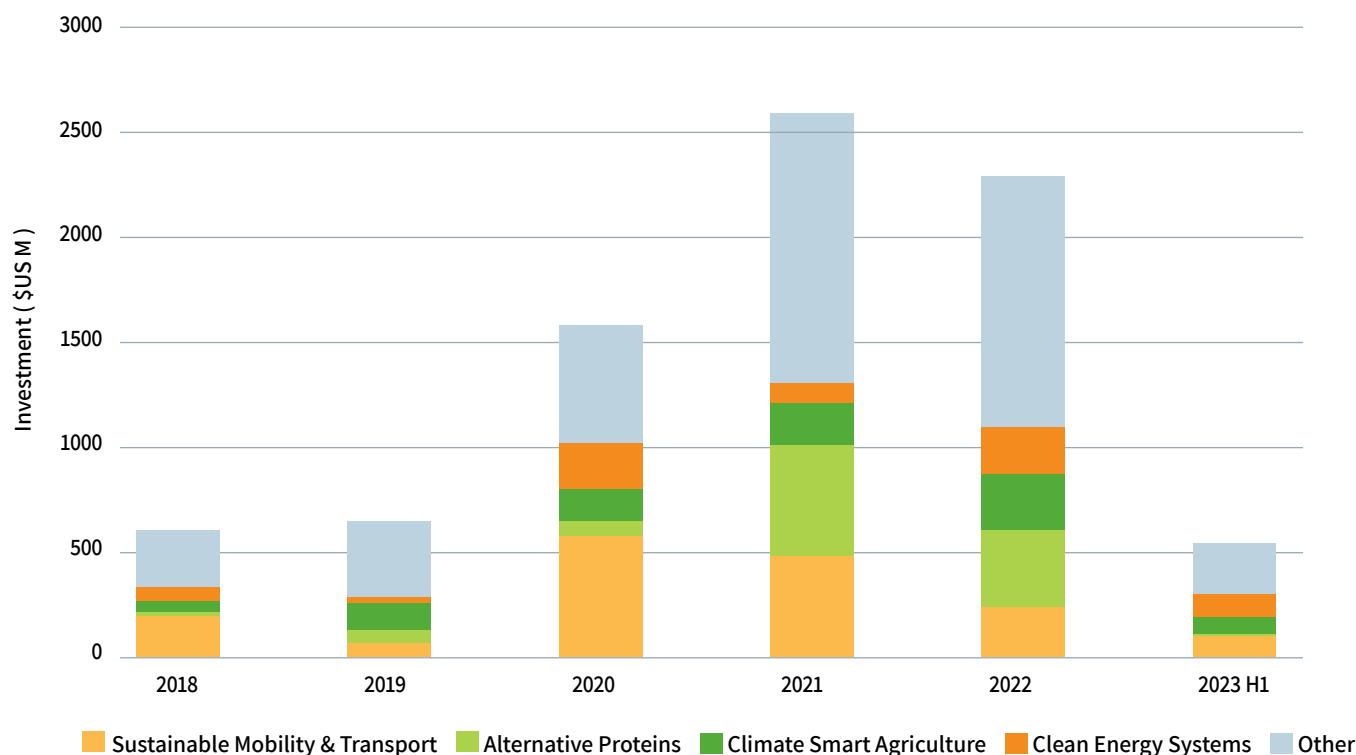
The four climate challenges which attracted the most funding between 2018-2022 were Sustainable Mobility & Transport, Alternative Proteins, Climate Smart Agriculture, and Clean Energy Systems, together comprising 52% of the total funding in this period (20.6%, 13.5%, 10.4%, and 8.1 % respectively).

These are the same four leading challenge areas by startup numbers in the Israeli climate tech ecosystem (Figures 2 and 3), although the order of proportional investment in each challenge is exactly opposite to the number of startups established in each challenge area over the last 5 years (Figure 5). It will be interesting to follow investment trends in these challenge areas as the more recently established companies mature, to see if they receive a greater share of future investments.

The slight decline in funding between 2022 compared to 2021 comes after a 320% growth between 2018-2021. The decline is small (12%), and the near stability between the two years parallels global climate tech trends over the same period, with investments remaining around \$40B in 2021 and 2022 (Figure 9).²¹

Overall investments in early and growth stage startups in Israel decreased from \$28.2B in 2021 to \$15.9B in 2022,²² and when excluding the climate tech investments in each year, show a decline of 47%. In other words, overall investments in Israel declined 4 times more than climate tech investments between 2021 to 2022. A comparison of the drop in investments in Israel for fintech, the leading field for 2021 investments,²³ reveals that the decline in fintech investment was 5 times higher than that in climate tech investments. This demonstrates that climate tech is extremely resilient to the general slowing of investments that evolved in Israel during this period.

FIGURE 8 | Investments in Israeli Climate Tech Startups



21 <https://pitchbook.com/news/articles/vc-climate-tech-drop-2023-startups-founders>; <https://www.ctvc.co/climate-tech-h1-2023-venture-funding/> (both Pitchbook and CTVC report on global investments of approx. \$40 billion in 2021 with slight increase/decline around that figure for 2022).

22 IVC -LeumiTech Israeli Tech Review Q1/2023.

23 IVC -LeumiTech Israeli Tech Review Q1/2023 July 2023.



\$2.3B

funding for
Israeli climate
tech in 2022



14 CENTS

of every dollar
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400%

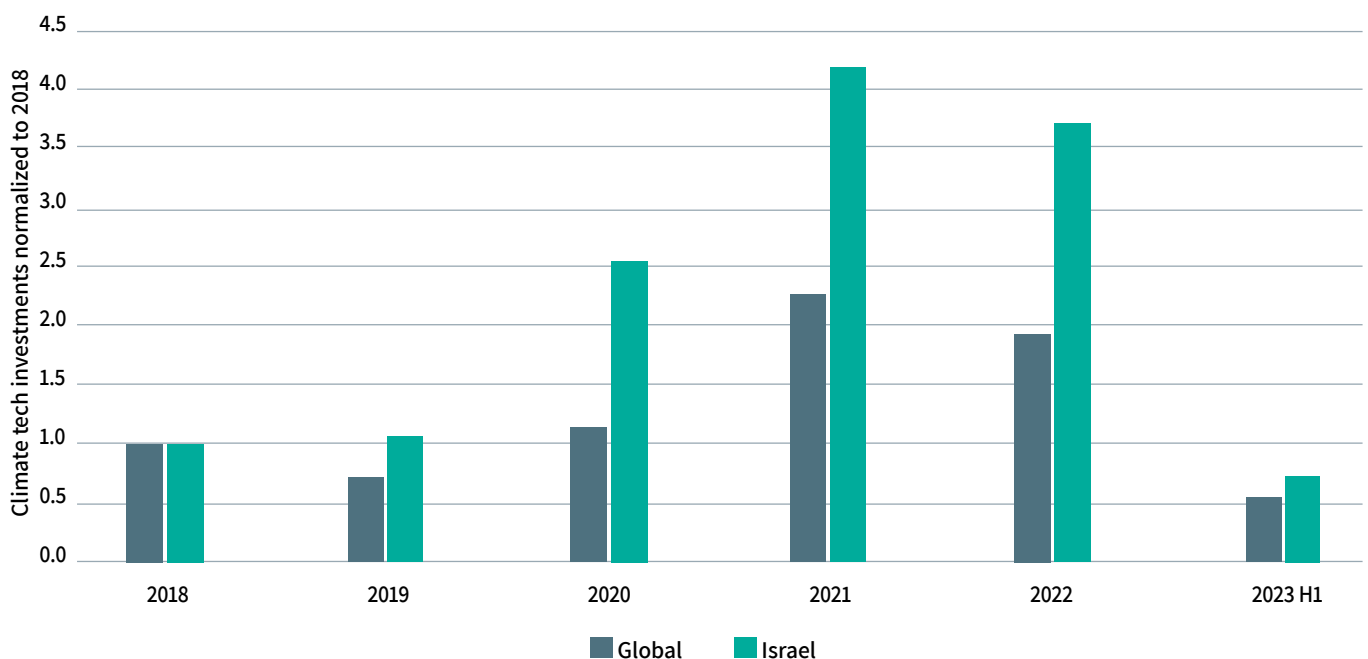
more resilient
than general Israeli
tech in 2022

The above investment values for 2022 mean that for every dollar invested in Israeli high tech in 2022, 14 cents went towards climate tech.

The climate tech investments for H1 2023 show less resilience to the slowing market, with investments decreasing by approximately 60% compared to the sums we reported for H1 2022, a ratio that parallels the sharp decline in Israel for

all tech investments between H1 2022 and H1 2023.²⁴ This is also consistent with the trend seen in the global climate tech market, where investments declined sharply (Figure 9).²⁵ We can characterize Israeli climate tech investments as having developed rapidly since 2018 – even outpacing global growth – whereas since 2021, it has behaved more similar to the global climate tech ecosystem, perhaps a sign of the mainstreaming of the market.

FIGURE 9 | Investments in Israeli and Global Climate Tech Startups Relative to 2018 Investment Values



²⁴ IVC - LeumiTech Israeli Tech Review , Q2 2023/July 2023.

²⁵ <https://www.ctvc.co/climate-tech-h1-2023-venture-funding/>

Israel's Climate Tech Startups

Funding Stage of Climate Tech Startups

The funding stages for the set of climate tech startups is shown in Figure 10. The majority of funded startups are still at the seed stage (44%), and less than 8% of companies have progressed beyond Round B.²⁶ This is consistent with the finding that most startups (67%) are still relatively young and thus, for the most part, still in early fundraising rounds.

Over 14% of the companies are either publicly traded or have completed an exit through acquisition or merger (termed “Mature”).

Investor Types and Origin

Since 2018, Israeli climate tech has attracted almost 540 investor groups as well as a large number of additional private investors. Many of these investor groups have invested multiple times – averaging 2.7 investments per investor.

Over 50% of the funding derives from Venture Capital Funds (Figure 11).

52% of the investors are Israeli and 48% are non-Israeli, predominantly from the USA (Figure 12).

VC investors’ origins are quite evenly distributed between Israel and overseas. However, corporate VC’s investments originate nearly entirely from non-Israeli entities (Figure 13).²⁷ Most of the private investors – not shown in the charts – also originate from outside of Israel.

FIGURE 10 | Funding Stage of Climate Tech Startups

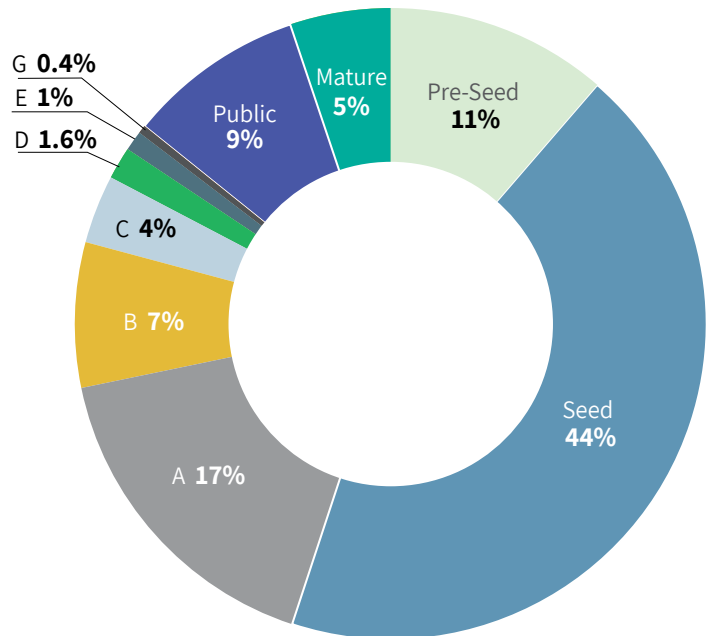
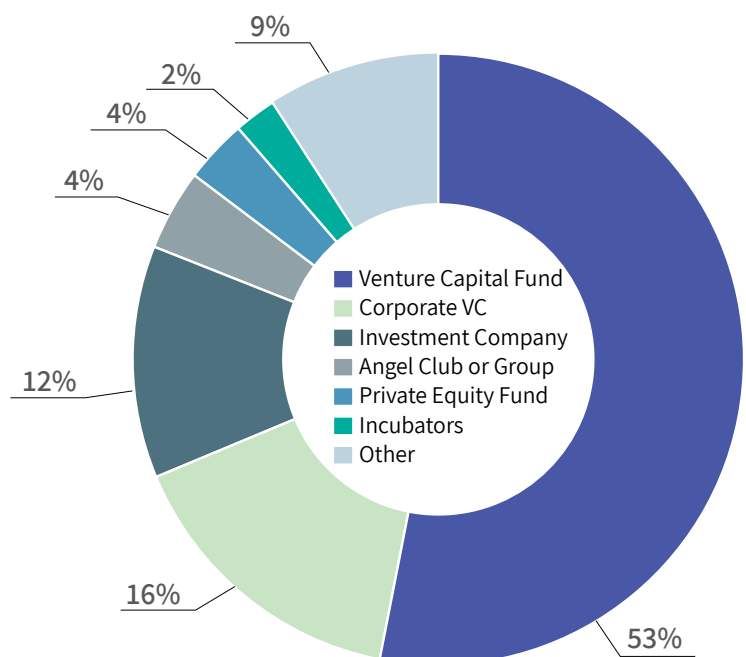


FIGURE 11 | Climate Tech Investors by Type (2018 - H1 2023)



²⁶ Not including companies that went public or were merged or acquired.

²⁷ Figure 13 is for 2022, but the distribution is nearly identical for each of the years 2018-2022.

FIGURE 12 | Climate Tech Investors by Origin

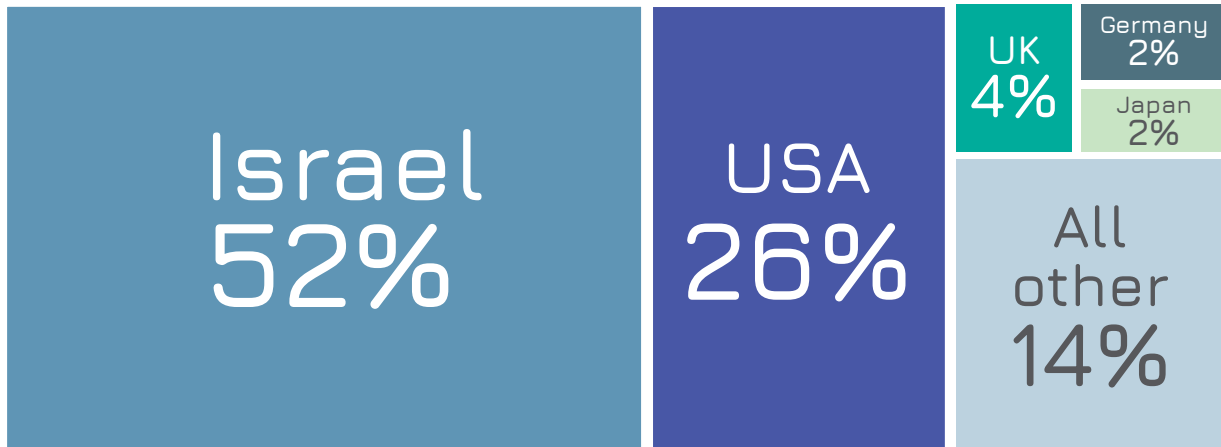
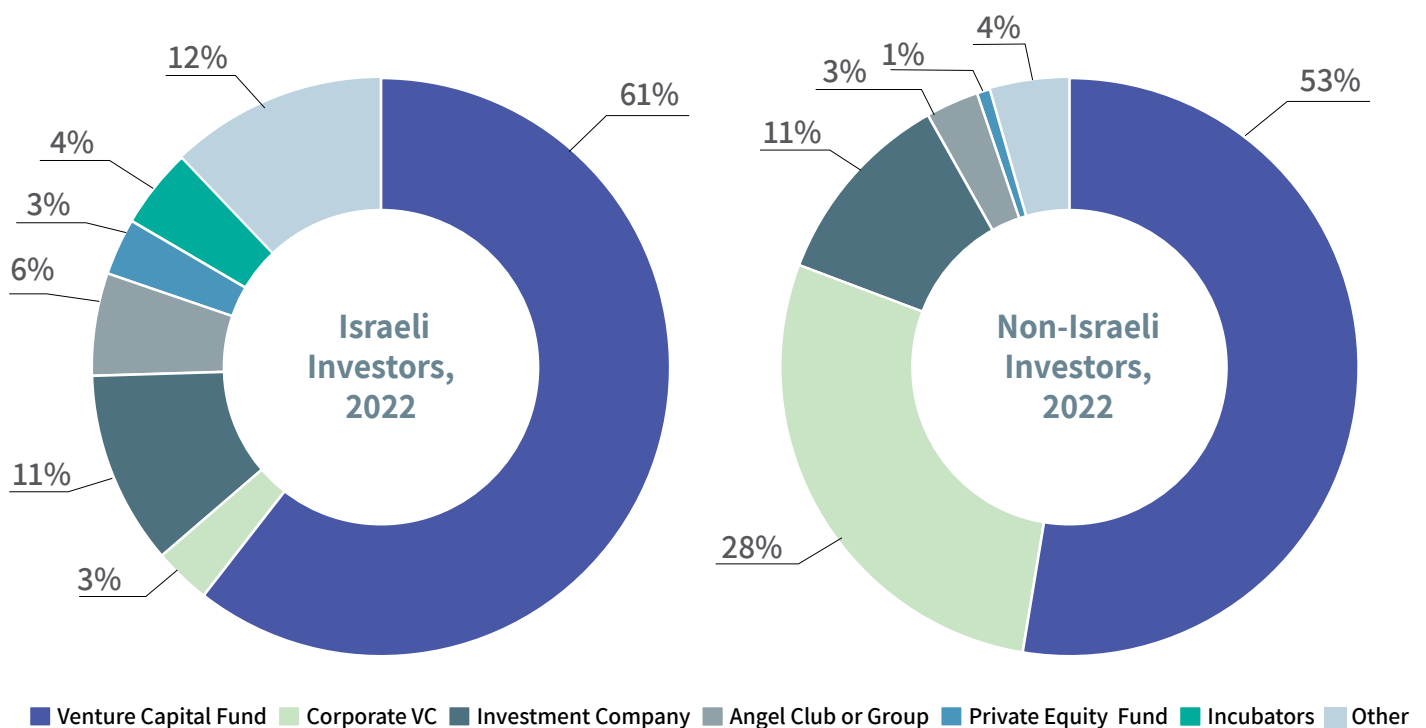


FIGURE 13 | Climate Tech Investors by Origin and Type



Israel's Climate Tech Startups



Government Investments

Government support for climate tech originates from several ministries and entities. The Israeli Innovation Authority occupies a unique position as the government entity responsible for accelerating and strengthening Israel's hi-tech entrepreneurship and leadership, doing so through R&D investments in sectors addressing global and local technological challenges. Since 2021, the Authority has made climate tech one of its focus areas, supporting and de-risking climate tech technological development and ecosystem growth.

In 2022, the Authority supported 273 climate tech ventures with a total budget of \$71.4 M, which comprised 16% of its annual budget. This support was provided through various tools of the Authority.

- ◉ **Incubators and Labs:** The Authority supported ideation and early-stage ventures via 7 incubators and innovation labs, 2 of which were established in the last two years.
- ◉ **R&D Consortia:** 3 new "MAGNET" consortia were established²⁸ – in the fields of Cultured Meat, the Black Soldier Fly (Circularity), and Bioplastics.
- ◉ **Pilots' Program:** Together with other government ministries and entities – the Ministry of Environmental Protection, the Ministry of Energy, the Ministry of Agriculture, and the Government Companies Authority – the Authority invested \$9M in climate tech startups

with ventures in their later-phase R&D pilot testing and implementation.

- ◉ **Advanced Manufacturing:** The Authority provided support for climate tech companies in their scale-up of R&D projects within commercial manufacturing facilities.
- ◉ **Human Capital:** The Authority utilizes its Human Capital support tracks to increase capacity building in climate tech fields, to enhance entrepreneurship skills of climate tech experts, and to fill the gaps in capabilities for new and modified fields of expertise.
- ◉ **International Collaboration:** The Authority, under its International Division, has launched a program to promote collaboration in R&D and pilots of Israeli startups and multi-national corporates in climate-related fields. This program promotes the exposure of Israeli innovation to global markets and global collaborations.
- ◉ **The participation of Israel, as an associated country, in the European framework program for R&D:** Horizon-Europe enables startups, academic researchers, and other entities to collaborate in European projects to promote climate-related solutions. Membership is funded by the Authority, the Council for Higher Education, and the Ministry of Innovation, Science and Technology. Under the framework of Horizon-Europe, additional governmental ministries, e.g., the Ministry of Environmental Protection and the Ministry of Energy, also support Israeli entities participating in different European climate related collaborative projects.

Additional Government Support from Ministries

- ◉ In addition to collaborating with the Authority Pilots' Program, **the Ministry of Environmental Protection** has collaborated with the Authority in supporting early-stage ventures in ESIL – a joint public-private innovation lab focused on Energy and Sustainability.
- ◉ In addition to collaborating with the Authority in the Pilots' Program, **the Ministry of Energy** also promotes climate innovation in dedicated support programs from academic research to pilots (totaling 30% million for 2022).
- ◉ Additional ministries operate climate support projects via their Chief Scientist departments.
- ◉ In July 2023, Israel's Council of Higher Education approved its 5-year-plan and will allocate \$130 million over the next five years for research into the climate crisis and sustainability.

²⁸ MAGNET provides grants for R&D collaboration as part of a consortium between industrial companies and research institutions.



The Israel Innovation
Authority supported

273
ventures
with a total budget of
\$71.4M

Activity in Global Funding Programs - Horizon Europe

Participation and success rates of Israel within Horizon Europe, Europe's largest climate funding program and the largest R&D program in the world, provide an indicator of Israel's capacity and readiness level in climate tech domains.

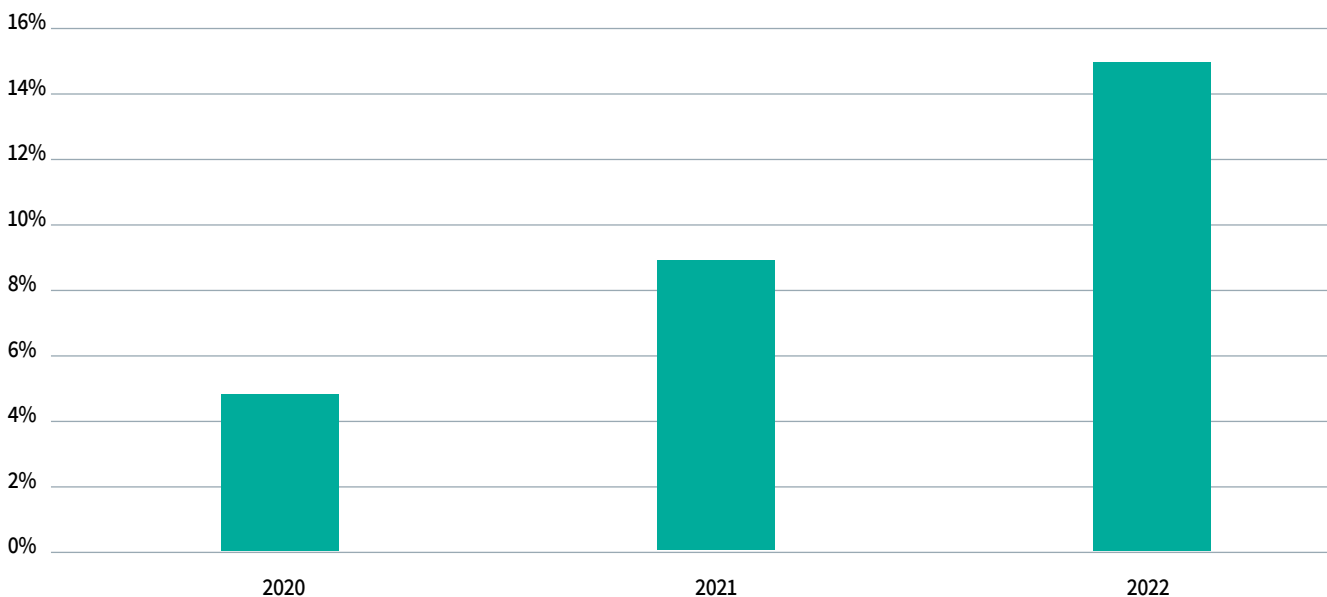
Data on Israeli participation in the European Framework Program for Research and Innovation "Horizon-Europe" was taken from the Horizon Dashboard, on the European Commission Funding and Tenders Portal,²⁹ and refers to the years 2021-2022. The data on participation in Clusters 5 and 6 of Pillar 2 of the program (with the titles "Climate, Energy and Mobility" and "Food, Bioeconomy, Natural Resources, Agriculture and Environment", respectively) were considered climate-relevant, including the European Missions – Soils, Ocean, Climate and Smart Cities. This data was considered comparable to the 2020 data presented in "Israel's State of Climate Tech Report, 2021",³⁰ which presented the results of the 20 calls for proposals that comprised the Horizon 2020 Green Deal.

The number of participants in 2022 was significantly higher than in 2021, (219 vs 142), a fact that may partly be explained by Israel's official inclusion in the Horizon Europe Program only towards the end of 2021, but which also reflects the larger number of Israeli entities – startups, academic researchers, and others – involved in climate-relevant technologies, research, and actions. A total of 317 Israeli entities submitted a project proposal in climate-relevant fields in 2022, with 62 of them (19%) being part of 55 projects selected for funding, securing over €22 million.

The success rate for acceptance and funding of proposals increased from 14% to 19% between 2021-2022. This bridges much of the gap between Israel and Europe, the UK, and the associated countries, whose average success rates for projects decreased slightly in the same period, to a little below 25%.

Assessing the improved success rates for participants, rather than projects, shows slightly lower numbers, but there is a clear progression in approvals and funding when compared to the 2020 Horizon Green Deal results (Figure 14).

FIGURE 14 | Success Rates for Israel's Climate Tech Submissions to Horizon Programs



²⁹ Updated for July 21, 2023.

³⁰ [Israel's State of Climate Tech Report](#).



Israeli entities secured **€22M** funding in Horizon - Europe climate projects in 2022

The fields with the highest number of Israeli participants were “Sustainable, Secure and Competitive Energy Supply” (“Energy” - 44 applicants, with a 14% success rate), “Fair, Healthy and Environmentally-friendly Food Systems from Primary Production to Consumption” (“Food and Agriculture” - 44 applicants, with a 21% success rate) and “Safe, Resilient Transport and Smart Mobility Services for Passengers and Goods” (31 applicants with a 10% success rate). It is noteworthy that these fields reflect the four most prolific climate challenges addressed by Israeli startups (see Figure 2).

Food and Agriculture, Israel’s well-established area of expertise, tripled its 2021 funding as the result of an increase in the total number of submissions from the field. Energy secured no funds in 2021, despite having the highest number of submissions, however this was rectified in 2022 with increased submissions, an above-average success rate, and high funding.

Israeli participants are increasingly and more successfully involved in the Horizon programs with success rates by participant numbers tripling since 2020 (5% vs 15% in 2020 and 2022, respectively). Project success rate is even higher than participant success rate, a fact that may allude to the innovative technologies involved, and the high quality of the proposed projects.





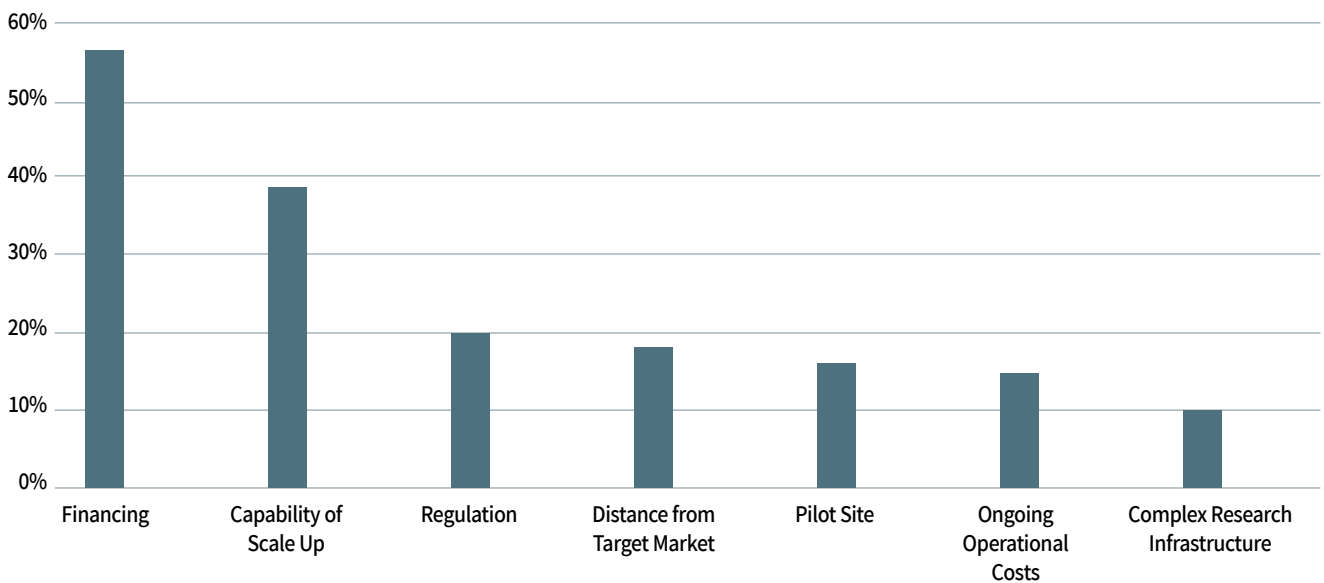
Barriers to Scaling and Growth Faced by Israeli Startups

Climate tech startups face unique scaling challenges. They are mostly deep tech, requiring expensive physical assets and equipment, are capital intensive, and have long-term horizons for development from the initial proof of concept stage until commercialization. Until this endpoint, startups need to establish pilot demonstrations and are challenged by the extended period needed to progress from a pilot plant to the sufficient scale and competitive costs required to reach commercial viability. Solutions often address systemic challenges, requiring a collective effort and collaboration between various private and public stakeholders, as well as cross-disciplinary and intersectional thinking. Climate tech solutions can incur both market and technology risks, making the provision of scale-up capital from growth investors a double challenge.

A survey conducted among 210 Israeli climate tech companies revealed the main difficulties faced by Israeli companies during their development and growth stages. The distribution of respondents across PLANETech challenge areas was very similar to their distribution among the full data set of climate tech startups, indicating that the respondents were an accurate representation of the broader startup ecosystem. Alternative Proteins was the only sector under-represented in the survey.

The two primary self-reported difficulties (out of the 13 proposed) were Financing and Capability of Scale Up, followed by Regulation, Distance from Target Market, Pilot Site and Ongoing Operational Costs, in that order.

FIGURE 15 | Barriers to Scaling and Growth Faced by Israeli Startups



The three most highly cited difficulties are identical to those reported in 2021, although the number of startups affected by each differs. Financing still dominates but was reported as a main challenge by only 57% of the startups compared to 72% in 2021. Capability of Scale Up increased, being cited by near 40% of respondents compared to 28% in 2021, while Regulation was reported by only 20% of the startups, compared to 30% in 2021 (Figure 14).

The startups responding to the survey were from the pre-seed stage through to Round C, as well as public companies. The lack of funding is more prominent for early-stage companies (pre-seed, seed, and Round A) whereas Capability of Scale Up and Regulation are cited more frequently by companies from Round B and onwards. The lack of Pilot Sites is mostly faced by pre-seed and seed companies.

The predominant barriers faced are distributed somewhat similarly across companies of each challenge area.

Interestingly, the only challenge area with a clearly different pattern was Carbon Management, Risk and Finance where the main challenge faced is Distance from Target Market. This is consistent with the fact that startups in this challenge area are generally software-based digital platforms which are easier to fund due to their low capital intensity, are more straightforward to scale due to shorter development duration, and have little need to navigate regulation.

Over 80% of the startups have hardware at the core of their innovation. 29% are developing a hardware-only product, 53% a product that combines both software and hardware, while 18% are solely software. The two challenge areas which are dominantly software are Carbon Management, Risk and Finance and Earth Observations, the former developing digital platforms and the latter, for the most part, utilizing datasets acquired by existing hardware instrumentation run by third parties.

The three primary difficulties for startups are:



FINANCING

57%
of respondents



CAPABILITY OF SCALE UP

40%
of respondents



REGULATION

20%
of respondents

Barriers to Scaling and Growth Faced by Israeli Startups

Respondents were asked to detail gaps in local connections and services. Answers were varied and often related very specifically to a startup's focus and unique experience. Nevertheless, a recurring theme cited was the lack of knowledge and experts in the startup's domain (industry, scientific and research experts), as well as the limitation of a small market and the lack of pilot sites.

An indicator of the evolvement of Israel's climate tech ecosystem is the startups' increased capabilities to quantify the reduction in GHG emissions implementation of their product. 54% answered positively in this regard, compared to only 33% in 2021. Moreover, a further 24% can provide a preliminary assessment. Only 7% reported that they were unable to provide an assessment.³¹

Proliferation of Israeli Climate Tech Innovations in Global Markets

Of the survey respondents, 80% already have a product being used, piloted, or have agreements for its future use. The Israeli market is the most prolific, with nearly 80% of the startups operating within its borders, meaning that around 20% do not target the local market at all. This can likely be attributed to the size limitations of the local market, leading to an early global "Go to Market" strategy as well as many of the innovations' compatibility to specific target markets. The penetration of global markets is impressive and Israeli climate tech innovations can be found worldwide, predominantly in North America, Europe and Asia, followed by South America, Africa, Australasia and Central America (listed by the number of startups active in each region).

Figure 15 displays the geographic markets of the startups participating in the survey by specific countries, and the number of startups active in each country. Around 45% of the startups are active in the USA. The leading European markets are Germany, Italy, and Spain, with approximately 23% of the startups active in each. Canada has a similar representation of Israeli startups (23%). The leading markets in Latin America are Mexico and Brazil (14%), while India (15%) and South Africa (15%) lead in Asia and Africa, respectively. Australia is also a target market for 15% of the respondents.

Over 20% of the startups are active in at least 10 countries, and the median number of countries in which a startup is active is 4.

³¹ The remainder are either targeting climate adaptation or are enabler technologies for which it is more difficult to attribute the contribution to emission reductions.



For over
80%
of the startups hardware is
at the core of innovation



Over
50%
of the startups can quantify
the reduction in GHG
emissions from their product

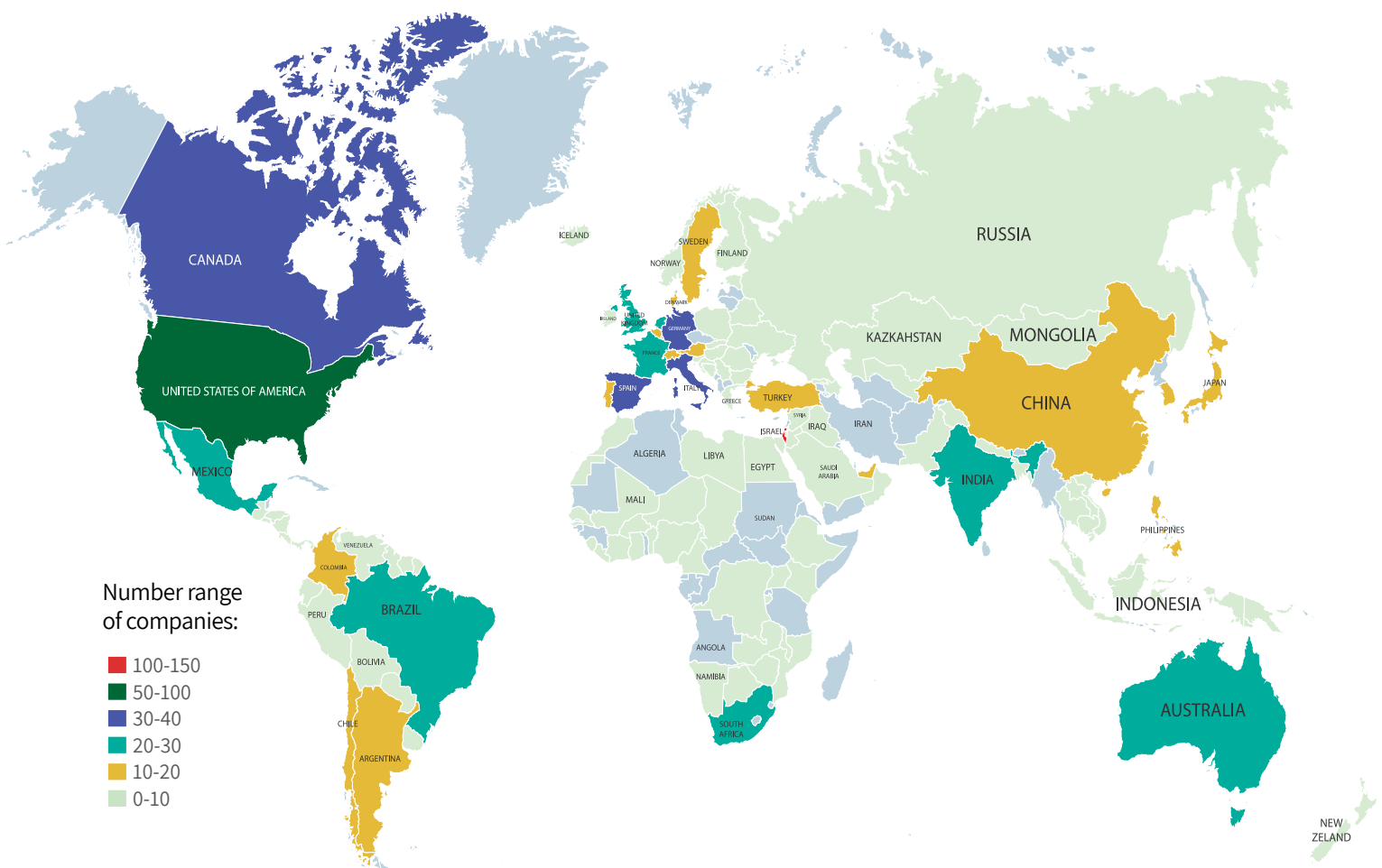


Over
20%
of the startups are active in
at least 10 countries



The median number of
countries in which a startup
is active is
4

FIGURE 16 | Global Deployment of Israeli Climate Tech Startups





Looking Ahead

This 2023 report highlights the role of multistakeholder players in the continued growth of the Israeli climate tech ecosystem. This is expressed in both the private sector with entrepreneurs, founders, startups, investors and the corporates and businesses deploying the innovations; And in the public sector where the state fulfills several roles, acting as regulator, dominant customer, and financier.

Israel has yet to exhaust its potential for innovation, commercialization, and scaling up of climate tech solutions. Fully realizing this potential will diversify the Israeli high-tech industry, create a world-leading hub, and promote global efforts for tackling the unmet needs of the climate crisis. Internally, it will support the attainment of Israel's national climate goals, boost employment and the economy, and enhance resilience and adaptation to climate changes on various fronts, including energy, water, and food security.

The government is taking an active role in driving the climate tech ecosystem forward, and the Israel Innovation Authority has identified specific climate tech domains to which various government tools can be applied with the aim of ensuring significant growth and value. These

domains were identified based on the local potential – in terms of knowledge base, existing startups, entrepreneurs, investments, and local strengths.

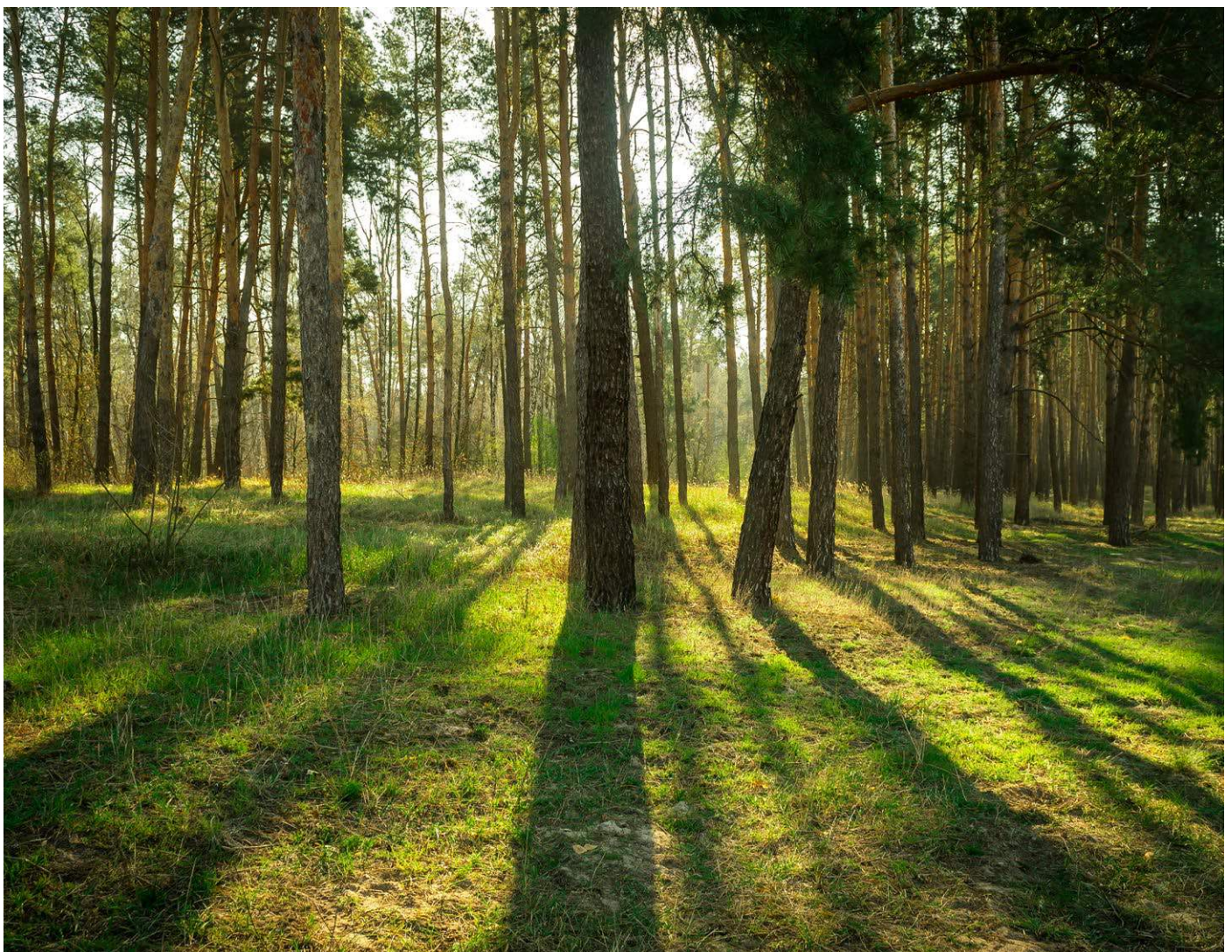
The identified climate challenge domains areas are: (a) Energy generation and storage; (b) Agriculture and food production – with a focus on precision agriculture, indoor (including vertical) agriculture/farming, and biotechnology, as well as alternative proteins (c) Eco-efficient water technologies; (d) Eco-efficient manufacturing, circularity, waste, and novel low-GHG materials and; (e) Carbon capture & storage, Carbon finance as well as Climate monitoring and forecasting.

These reflect the existing strengths of the local ecosystem as shown in this report (Clean Energy, Climate Smart Agriculture and Alternative Proteins), the domains which we identify as emerging and rapidly emerging (Circularity and Novel Materials, as well as Carbon Capture & Storage, Carbon Monitoring, Risk and Finance) and domains in need of further support such as Eco-Efficient Water Infrastructure – a mostly mature domain with past achievements in desalination and water treatment and Clean Manufacturing, currently showing stagnated growth.

The government actions to be implemented are the establishment of infrastructure, removal of regulation barriers as well as facilitation of knowledge transfer and collaborations. These are expected to provide a response to the barriers reported by the startups in this report and to facilitate growth and scale up.

This facilitation is complemented by the abundance of new initiatives from the private sector. Some examples are top talent moving into climate tech, new climate tech investment funds and verticals, the proliferation of new venture builders, accelerators and incubators, amplified focus in academia on technological solutions for climate, and a broader discussion within the general high-tech ecosystem on climate tech applications.

Climate tech competitions, hackathons, meetups, and events, for the most part collaborative efforts between varied stakeholders, are prolific, and bring in more and more individuals to climate tech, inspiring the creation of new startups. The existing collaborative spirit between all climate tech stakeholders (public, private and NGO's) and the combined approach of "bottom up" and "top down" will undoubtedly continue to drive the Israeli climate tech ecosystem to greater heights and success with growing global impact.



Israel's State of Climate Tech 2023

Innovating towards
a better planet