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GINSUM ClimateTech Briefing **1 of 6**

ClimateTech - Exploiting opportunities for cooperation between German companies and Israeli startups for the sustainable transformation of the economy

Climate change and climate targets require the transformation to a green economy. To realize this, while maintaining their competitive advantage, German Small- and Medium sized Enterprises (SMEs) need ClimateTech innovations. Israel is one of the world's leading ecosystems for ClimateTech startups. However, they need support in scaling their technologies.

Cooperation between Germany and Israel is rated as good by German politicians - with a positive tendency. The potential for cooperation between the two countries in the areas of science and education as well as business and innovation is rated very highly and the desire for stronger cooperation is emphasized.[1]

The commercialization strengths and scaling potential of German SMEs can be combined with innovative technologies from Israeli startups to manage the transformation. This briefing is the first in a series of six briefings on opportunities for cooperation between German companies and Israeli startups, with a focus on ClimateTech. The aim is to provide an overview of the status quo in Germany and Israel.

Based on economic and societal relevance, five technology fields (Clean Energy Systems, Sustainable Mobility and Transport, Climate Friendly Agriculture, Sustainable Water Management, Food Technology with a focus on Alternative Proteins) with particularly high potential for closer cooperation for the sustainable transformation of the economy, are identified.

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Ambitious goals require ClimateTech innovations

Climate change is the greatest challenge of our time. The key driver for the transformation of the economy and society in the European Union is the European Green Deal, which aims to make Europe the first climate-neutral continent by 2050, through a resource-efficient, competitive economy.[2]

In the Federal Government's Sustainability Strategy, Germany commits to contributing to the achievement of the 17 SDGs[3] of the United Nations and identifies a comprehensive need for action.[4] Through the Federal Climate Change Act in 2021, Germany commits to a reduction pf 65% in greenhouse gas emissions compared to the 1990 reference value by 2030 and to complete climate neutrality by 2045.[5]

The German government's coalition agreement of 2021-2025 "Mehr Fortschritt wagen" ("Daring more progress") also sees the 17 Sustainable Development Goals (SDGs) as a guideline for policy and places a focus on the sustainable transformation of the economy through (green) innovation.[6]

The requirements for achieving these ambitious goals are the sustainable transformation of the economy and society, among others through ClimateTech innovations.

ClimateTech - definition and global status quo

There is no uniform definition of the term ClimateTech. In many cases, the terms CleanTech and GreenTech are understood synonymously, as is the case here.[7] ClimateTech is generally understood to describe technologies that contribute to achieving sustainability goals, for example by actively reducing greenhouse gas emissions or addressing the consequences of climate change.[8/9]

The German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection defines the Green Economy as a climate-protecting form of economy that consists of circularity, reducing harmful emissions and lowering overall resource consumption. The Green Economy pursues the goal of protecting the climate, while maintaining economic efficiency.[10] The concept was officially recognized for the first time by the United Nations in the context of the United Nations Conference on Sustainable Development (UNSCD) Rio+20 in 2012, as an instrument for achieving sustainable development.[11]

ClimateTech can be delimited in particular by the fields of application and impact of the technologies.[12]

Based on the differentiation according to Roland Berger in the German GreenTech Atlas, MHP has identified seven global lead markets that are also of particular relevance for Germany (see Figure 1):[13]

In terms of content, these are congruent with the sustainability goals defined in the Sustainability Strategy[15] , the areas of the Green Economy distinguished by the Research for Sustainability Strategy (FONA)[16] and the fields of action of the European Green Deal.[17]

Despite the pandemic, the development of the international market is positive. Both the number and the amount of investments have increased continuously since 2013, enhancing their share of total venture capital.[18] The total volume of the global market for ClimateTech in 2020 was 4.628 billion euros, with significant growth potential.[19]

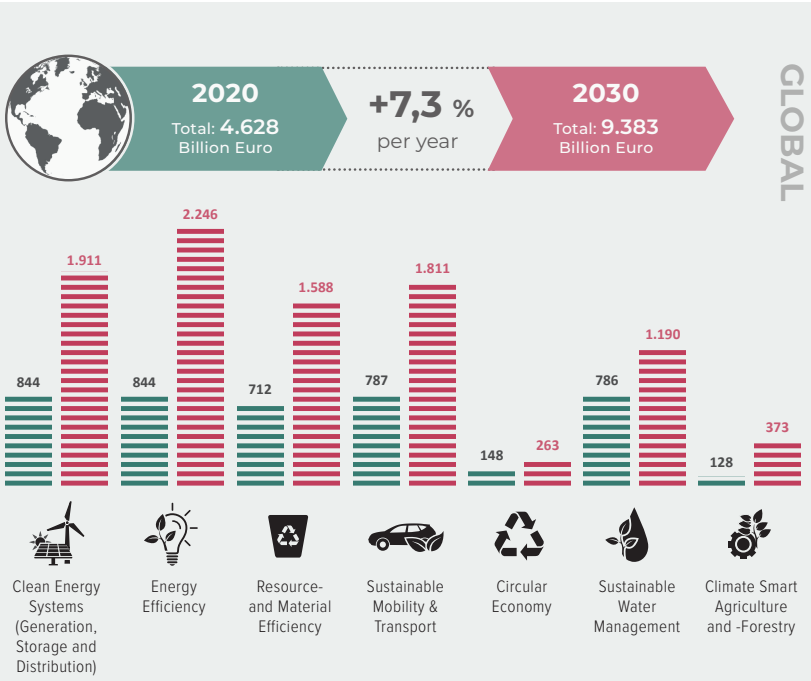
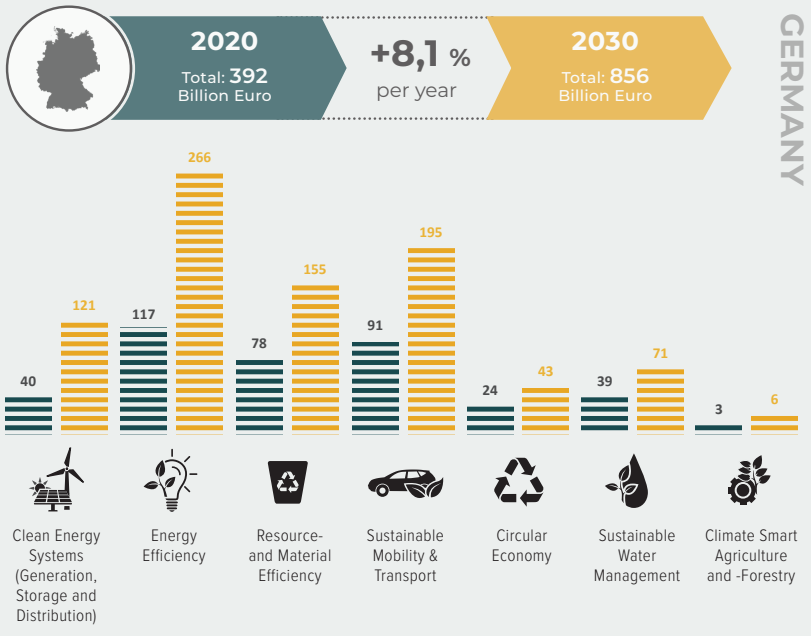


FIGURE 1

Development of lead markets in the ClimateTech sector in Germany and globally 2020-2030

Own representation based on data from[14]



ClimateTech in Germany - a significant industry with growth opportunities and risks

According to the Global Green Economy Index 2022, Germany is one of the top performers in the development and commercialization of ClimateTech.[20] However, the number of patent applications in the field of ClimateTech has recently been declining in Germany and thus lags behind the dynamics of other technology areas.[21]

Yet ClimateTech is of outstanding importance for the German economy. In 2020, the share of the Gross Domestic Product (GDP) was already 15%. A further increase in the share of employment and total turnover is expected in the upcoming years. At 14%, the global market share of the German ClimateTech sector in 2020 was many times greater than the share of the German economy in the global market as a whole (3%).[22]

The market volume for ClimateTech in Germany was 392 billion euros in 2020, divided among the seven lead markets, with the largest volumes in the areas of Energy Efficiency and Sustainable Mobility (see Figure 1 for the market shares and growth forecasts). German companies in the ClimateTech sector benefit from the large national demand and the resulting potential for systemic solutions. The growth

rates for the current decade are estimated at 7.3% on average for all lead markets nationally and internationally. This results in long-term global sales markets for German companies.[23]

There is visible growth in all lead markets, both globally and in Germany. Particularly noteworthy are the areas of energy, sustainable mobility, sustainable water management and resource and material efficiency (see Figure 1).

At the same time, increasing global competition can be observed. Emerging countries include the USA and China, but also Mexico and Brazil.[24]

With a share of over 90%, the German ClimateTech sector is characterized by a very high proportion of small and medium-sized enterprises.[25] In order to secure today's competitive advantage, it is therefore particularly important to strengthen the innovative power of these companies.

The German startup scene has also recognized the need for- and the opportunities of the sustainable transformation. The fourth Green Startup Monitor (GSM) shows the great potential and high relevance of ClimateTech startups in Germany. 43% of the surveyed startups classify themselves as Green Economy startups, 29% are identified as Green startups by the GSM. Among the German startups, the development of ClimateTech in particular is increasing and has reached its highest share since the survey began, namely 27%.[26]

Against the backdrop of its economic relevance, the positive market situation and increasing competition, approaches to promote the development and implementation of ClimateTech innovations are thus necessary.

Israel - world's leading startup ecosystem strengthens focus on ClimateTech

Israel has been a global innovation leader for years and is known for its startup ecosystem, which is considered the most powerful after Silicon Valley.[27] Through targeted political measures and the involvement of central actors (including Start-Up Nation Central and the Israel Innovation Authority), a dynamic environment for innovation and startups has developed.[28] For a long time, the startup scene was dominated by the fields of Cyber Security and IT. Tel Aviv is one of the most important startup ecosystems in the world, with high levels of investment. Over 370 multinational companies are based in Israel to take advantage of the potentials regarding innovation, cooperation and investment.[29]

During the UN Climate Change Conference in Glasgow in 2021 (COP26)[30], the Israeli government declared climate change to be a national security issue and defined the goal of taking a leading role in the development of ClimateTech.[31] Prime Minister Bennett formulated the vision to transform Israel from a Startup Nation to a Climate Innovation Nation.[32]

Thanks to systematic, targeted measures by central players, Israel is one of the countries with the strongest developments and the highest market dynamics in the Global Green Economy Index.[33] Tel Aviv also ranked second in Startup Genome's Global Startup Ecosystem Report, Clean Tech Edition 2022. Berlin and Frankfurt take up good positions (11th and 25th place), but lag far behind Tel Aviv. The evaluation criteria are performance, funding, startup experience, knowledge, talent and focus. Here, Tel Aviv achieves very high ratings, with the exception of the talent factor.[34]

Israels focus on ClimateTech becomes evident, for instance at Start-Up Nation Central, the leading Israeli NGO focusing on developing, networking and promoting Israel's startup ecosystem. In recent years, Start-up Nation Central has centered its activities around supporting and expanding the ClimateTech sector, providing the best conditions for startups.[35]

Under the leadership of the Israel Innova-

tion Institute, various innovation communities have also emerged as a collaboration of relevant actors, such as investors, startups, scientists, companies, accelerators and public institutions.

Through various activities, these communities aim to promote exchange among the actors and thus create optimal framework conditions for innovation. The communities include PLANETech (Climate Change Technologies), EcoMotion (Smart Mobility Community), DeserTech (Climate Technologies Community), GrowingIL (Agri. Culture. Community) and Ignite the Spark (Energy Tech Community).[36/37]

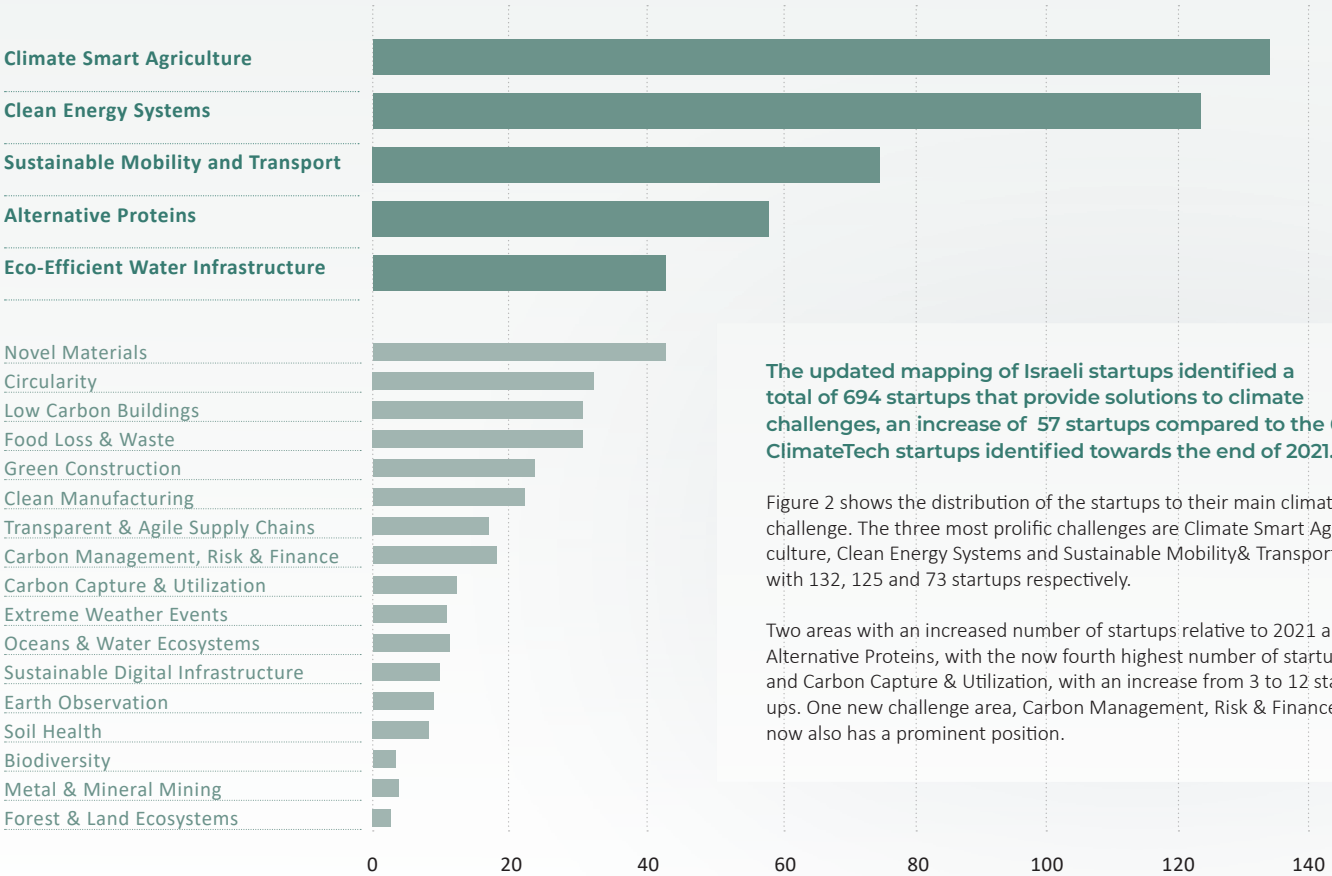
A more differentiated overview of the individual technology fields can be found in the "Israel's State of Climate Tech 2022 Update" report, with reference to 694 identified startups (see Figure 2). This corresponds with a share of 14% of all startups founded in Israel in 2021. 35% of them were founded since 2019, underlining the dynamic development of the ecosystem.[38]

Furthermore, the study suggests that Israeli startups are particularly active in the fields of Climate Smart Agriculture, Clean Energy Systems, Sustainable Mobility and Transport, Alternative Proteins, and Sustainable Water Management. The five areas mentioned are also the technology fields that account for the highest shares of the annual increase in investments.[40] In 2021, 2.5 billion USD was invested in Israeli ClimateTech startups, an increase of

FIGURE 2

ClimateTech Startups Classified by their Main Challenge Area

based on [39]



The updated mapping of Israeli startups identified a total of 694 startups that provide solutions to climate challenges, an increase of 57 startups compared to the 637 ClimateTech startups identified towards the end of 2021.

Figure 2 shows the distribution of the startups to their main climate challenge. The three most prolific challenges are Climate Smart Agriculture, Clean Energy Systems and Sustainable Mobility& Transport, with 132, 125 and 73 startups respectively.

Two areas with an increased number of startups relative to 2021 are Alternative Proteins, with the now fourth highest number of startups, and Carbon Capture & Utilization, with an increase from 3 to 12 startups. One new challenge area, Carbon Management, Risk & Finance, now also has a prominent position.

340% since 2018 and a growth rate 2.6 times greater than the global market.[41]

In the first half of 2022, almost 1.5 billion USD was already invested in ClimateTech, despite an overall decline in venture capital investments. As in 2020 and 2021, more than 50% of the investments were in Alternative Proteins, Sustainable Mobility and Transport, Climate Smart Agriculture and Clean Energy Systems.[42/43]

Generally, the biggest challenge for ClimateTech startups is not the availability of innovations, but the scaling.[44] This challenge is also evident in Israel, especially when it comes to the commercialization of ClimateTech innovations. As demonstrated by the overview of startup activities, numerous technology innovations exist in Israel, but only a few succeed in making a breakthrough on the market.[45]

Challenges for the commercialization of Israeli startups include the rollout of their technologies, national and international market access, financing, and national and international regulations.[46] Specifically, there is a funding gap in the early startup phases and, as a result of the comparatively small domestic market with few companies, limited demand.[47] The scaling of startups is also inhibited by access to capital, regulatory barriers and product-related scaling difficulties.[48]

Israeli startups are therefore benefiting from the increasing demand for ClimateTech innovations and are interested in cooperating with international companies, which the Israeli government wants to promote through the creation of conducive framework conditions and financial investments.[49]

Combining German commercialisation power with the innovation potential of Israeli startups

In the Global CleanTech Innovation Index 2017, Israel was classified as the "CleanTech Startup Generator" archetype, while Germany was assigned to the "Cleantech Commercializer".[50]

Against the background of the preceding presentations, this classification still seems to be permissible. While German companies need innovations in the five areas mentioned above to secure a competitive advantage, Israeli startups need cooperation partners who support them in financing, commercializing and scaling their technologies. Cooperation between German companies and Israeli startups therefore offers enormous potential for both sides.

Several German companies are active in Israel, with the aim of interacting with startups. In 2018, Volkswagen established the Open Innovation Hub Konnect Campus Tel Aviv[51] and Siemens established the Open Innovation Program Siemens Dynamo.[52] Many multinational companies, including Volkswagen, Mercedes Benz, BASF and Bayer for example, have innovation hubs or invest in Israeli startups, to access innovations in the field of ClimateTech.[53/54/55]

Contrastingly, SMEs are generally rather reluctant to cooperate with Israeli startups and have not yet exploited this potential.[56] In their study, the Bertelsmann Foundation identified a lack of market access, a lack of transparency regarding relevant actors and a lack of resources to identify suitable partners as key barriers to cooperation.[57] Despite corporate cultural differences and challenges[58], this shows precisely where the needs and opportunities for successful cooperation are.[59]

German SMEs need support in successfully initiating and realizing cooperations with Israeli startups. Conducive framework conditions and suitable exchange formats must be created for this purpose. In 2020, the European Leadership Network (ELNET) founded the German Israeli Network of Startups & Mittelstand (GINSUM) to promote cooperation between German SMEs and Israeli startups through its various activities, in order to exploit the prevailing potential.[60]

Such initiatives can be supported through

binational collaborations. Successful examples are the Binational Industrial and Research Foundation (BIRD) between the USA and Israel in the field of Energy and Water Management[61] and the Climate Solution Prize awarded jointly by Canada and Israel, which is endowed with 2 million USD[62]. The energy partnership between Germany and Israel for the development of solutions against climate change offers such a cooperation, including the strengthening of the exchange of German companies with Israeli startups in the focus area of energy.[63] In addition, the German Chamber of Commerce in Israel offers German companies support in technology scouting.[64]

Five sectors with high potential for cooperation

An examination of the status quo of the ClimateTech sector in Germany and the ClimateTech startup ecosystem in Israel reveals great potential for cooperation in significant areas. Against the background of the present briefing, three questions in particular are crucial for identifying the sectors to be considered more closely and those with the greatest potential for cooperation:

- In which sectors are Israeli startups particularly active and innovative?
- Which sectors are of high importance in Germany due to their economic significance and market potential?
- Against the background of Germany's contribution and leading claim in achieving the global sustainability goals, in which sectors is there outstanding potential for cooperation with Israeli startups?

On this basis, the following five fields were identified as particularly relevant.

1. Clean Energy Systems

SDG 7 strives for affordable and clean energy.[65] The expansion of renewable energies and the use of climate-neutral energy are central components of the German sustainability strategy.[66] The existing energy crisis underlines the urgency of action. At the same time, there is great market potential (see Figure 1) and a particularly high level of innovation among Israeli startups.[67] A framework for cooperation already exists due to Germany and Israel's energy partnership.[68]

2. Food technology & 3. Climate Smart Agriculture

The expected global population growth, increasing droughts and the associated food crisis are major challenges.[69] To achieve the second SDG[70] (No Hunger), new approaches to food production and processing as well as technologies to increase food quality are required. At the same time, food is responsible for a large share of global CO2 emissions. Thus, innovations are needed in both agricultural and food technology to realize the green transfor-mation of the economy. In both fields, especially in the field of Alternative Proteins, Israeli startups are leading the way.[71/72] Through the cooperation of German companies with Israeli startups, Germany can take a leading role in the development and scaling of innovative technologies.

4. Sustainable Mobility and Transport

Sustainable mobility and transport are core objectives of the German sustainability strategy and a decisive factor for the German economy (see Figure 1).[73] As described, several large German companies are already actively cooperating with Israeli startups in this sector. Due to the high innovation dynamics and the breadth of the field, there are also opportunities for medium-sized companies.

5. Sustainable Water Management

Due to the climatic conditions, numerous innovations for Sustainable Water Management are emerging in Israel. For example, Israel manages to treat and reuse 90% of its agricultural and industrial water resources.[74] Increasingly dry summers and the associated consequences require innovative solutions in Germany as well, while Israeli farmers are hardly exposed to the problems mentioned above.[75] Especially in this area, Israeli startups have a lot of potential for scaling.[76] Thus, closer cooperation can combat problems in Germany and contribute to achieving SDG 6[77] (Clean Water and Sanitation) globally at the same time.

Outlook: Policy Briefings Series "ClimateTech made in Germany and Israel"

The upcoming publications of the series will examine the five identified technology fields more closely: Clean Energy Systems, Sustainable Mobility and Transport, Climate Smart Agriculture, Sustainable Water Management and Food Technology (with a focus on Alternative Proteins). In each case, the status quo of activities in Germany and Israel will be described and synergies and potential cooperation formats will be discussed. The objective is to provide an overview of the opportunities, as well as suggestions for political measures by calling on the relevant actors to make use of the potentials.

Recommendations for Action

The expansion of cooperation in the area of ClimateTech has great potential. Initial recommendations for action on cooperation between Germany and Israel in the area of ClimateTech are derived from the analysis. These will be further deepened and supplemented by successively taking a closer look at the areas of Clean Energy Systems, Sustainable Mobility and Transport, Climate Smart Agriculture, Sustainable Water Management and Food Technology.

▶ Germany should actively support SMEs in cooperating with Israeli startups by creating the corresponding regulatory framework.

▶ The establishment of exchange formats for ClimateTech innovations between German SMEs and Israeli startups is necessary as a basis for interaction.

▶ By initiating a German-Israeli competition for joint ClimateTech innovations, attention and incentives can be created.

▶ The establishment and expansion of binational funding and financing programs for the cooperation of German companies with Israeli startups in the areas of ClimateTech, based on the models of the Israeli co-financing[78/79] and BIRD[80], are recommended. This can be realized for instance by setting up an incubator program, jointly financed by Israel, Germany and the German SME sector, with a focus on ClimateTech, or following the model of the German Accelerator Program.

▶ The cooperation between the German Federal Ministry for Economics and Climate Action and the Israeli Ministry of Energy within the framework of the energy partnership should be extended to the four other identified technology fields.

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