



MEAT REPLACEMENTS

Agri, Food & Beverages Sector

INDUSTRY REPORT 2020

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01.

The Revolution within the meat industry

The rapidly growing popularity of meat substitutes is widely seen as one of the most striking and far-reaching developments within the food industry. Driven by increasing consumer demand, product introductions and innovations are accelerating the growth of the international market for meat substitutes.

As a result, the market entry of multinationals constitutes a catalyst for further product development and innovations, resulting in international growth. Nestle sells vegan meat products under their Gourmet Garden brand and launched plant-based burgers in the US and Switzerland in 2019 under their Sweet Earth brand. Sweet Earth was acquired 2017 by Nestle. Unilever acquired in 2018 The Vegetarian Butcher, a Dutch maker of plant-based meat. Kellogg daughter company Morningstar Farms plays a major role in the veggie-burger market and has planned to introduce the Incogmeato burger, designed to mimic meat's look and flavour; because of COVID 19 Kelloggs's decided to delay the market launch. Tyson Foods (USA) sold its stake in plant-based meat pioneer Beyond Meat (USA, founded 2009) prior to the latter's IPO in 2019, so that it could make its own meatless burgers. Privately held Impossible Foods (founded 2011 in California) raised \$ 500 mio. in its latest series F funding round.

02.

Strong Growth Markets

The international market for meat substitutes is growing rapidly. At present, meat substitutes are still a niche and real meat is dominant. However, traditional meat consumption in Europe is shrinking. The main reason for this is a shift in consumer demand: health consciousness, rising environmental and sustainability issues plus the fact that people care a lot more where their food is coming from. The rise of 'flexitarian' consumer, who continues in contrast to vegans and vegetarians to eat meat, but consumption is reduced in favour of alternatives, makes meat substitutes a rising market. FoodBev states that one-third of consumers is actively choosing to reduce their meat consumption¹.

According to The Green Revolution, a report made by consulting firm Lantern, green flexitarian, vegetarian or vegan diets have increased 27% in Spain during the past years. In Germany 63% of the population wants to reduce their meat consumption according to YouGov 2019. Globally, sales of meat substitutes will increase tenfold and skyrocket to \$ 140bn over the next 10 years, according to business bank Barclays.



¹ <https://www.foodbev.com/news/five-major-trends-driving-the-plant-based-food-market/>

03.

Current challenges in the meat industry

In addition to the challenges that the meat industry is facing because of changing consumer demand regarding the increasing number of flexitarians, there are other challenges in today's climate. AT Kearney² recognises the following three categories:

1. Land challenge;
2. Intensification challenge;
3. Livestock challenge.

1. Land challenge

With the world's population rising to 9 billion by 2050, the world will need as much food over the next 40 years as the total production of the past 8,000 years put together³. As a result, the world faces climate change, scarcity of raw materials and land and a shortage of food, if alternatives are not thought of in time. Global warming is causing a shortage of agricultural land, which means that less food can be grown, including meat and feed for meat processing. In addition, the growing world population has a negative effect on the available arable land since this population needs to be accommodated. Lastly, the effect of global warming means that water will become scarce, as less rainfall will fall, however, water scarcity is not only a consequence of reduced precipitation. This means that the already degraded arable land will also become less fertile.

² AT Kearney, How will Cultured Meat and Meat Alternatives Disrupt the Agricultural and Food Industry?

³ <https://agrifoodtech.nl/>



2. Intensification challenge

To produce meat, input is needed in the form of feed for livestock. Problems in arable land such as soil erosion and soil compaction therefore contribute negatively to the production of this input for the meat industry. In addition, chemicals are becoming more and more resistant and stricter legislation is being applied. As a result, arable land can also be harvested less efficiently.

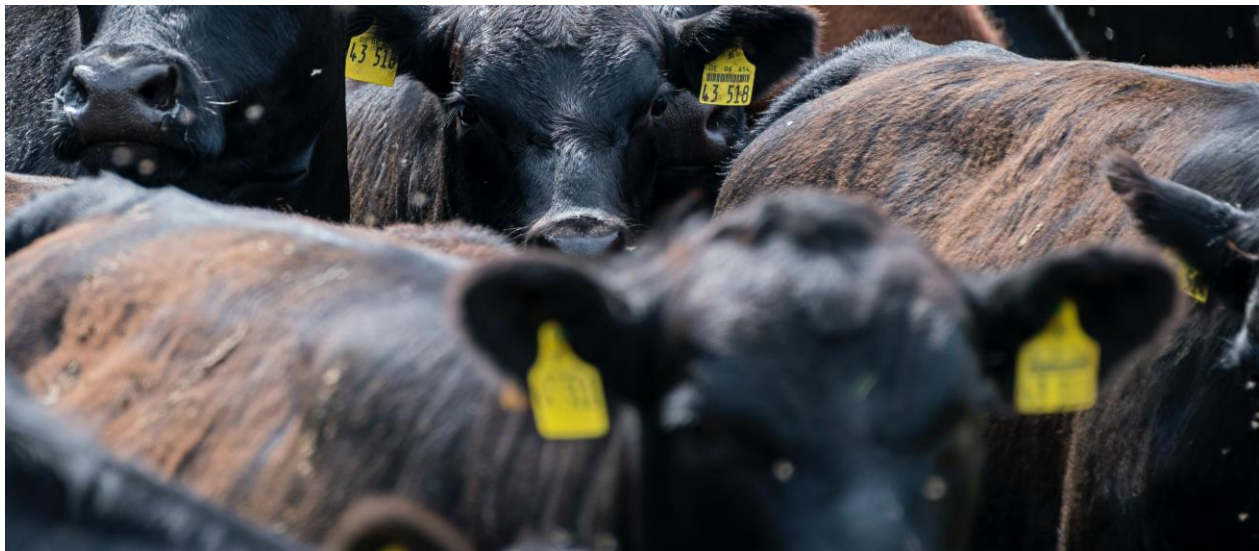
3. Livestock challenge

Because of the increasing pressure from consumers, the meat industry faces higher attention regarding production and processes as well. The use of Antibiotics and animal harm are more in the spotlight. COVID-19 has further increased the pressure as some production facilities were forced to shut-down and plant-based meat producers were likely benefactors.

04.

Trends in the meat industry

Predominant innovations, including digitalisation, simply increase efficiency of conventional production methods and will not overcome global agricultural and food challenges. Influenced by the above challenges, the meat industry has seen new market entrants coming forward to gain market share from the traditional meat industry. Three major product developments trends are visible.



Vegetarian plant-based food

A growing type of vegetarian foods are plant-based meat substitutes. For example, soy-based burgers. This new type of meat replacements gains market share rapidly. BIS research estimated in a recent report that the plant-based market will reach \$ 480 billion by 2024, with a projected CAGR of 13,82% from 2019 to 2024⁴. In addition, Nestlé reported that 87% of the Americans are currently including plant-based proteins in their diets. With one third of the consumers choosing to actively reduce meat consumption, this trend is expected to greatly disrupt the traditional meat industry.

The rise of this meat alternative is described by Deloitte as a shift predominantly driven by consumer concern surrounding health, wellbeing, environmental and animal welfare. Besides these ethics and health arguments, climate change, taste, and the emergence of flexitarians play an important role in the rise of this meat substitute. Experimental biology has calculated that the production of plant-based meat alternatives contributes to 10 times lower emissions than for the same production of traditional meat. This ensures consumer awareness and therefore reduces traditional meat consumption. Further innovations in taste, look, texture and variety in combination with technological developments to achieve this will give this substitute an acceleration of market share in the future.

⁴ <https://www.foodbev.com/news/five-major-trends-driving-the-plant-based-food-market/>



Insect based

Another emerging trend is the protein replacement of eating insects or using insect-based proteins as ingredient for meat substitutes.

This alternative offers very positive results in terms of protein and energy transition – for amongst other reasons– their lack of use of water and feed. Because of the possibility of industrialised indoor farming, this alternative is less susceptible to the scarcity of land. According to several scientists, insects are the food of the future. Insect-based meat replacements have however a negative consumer image. Although this can shift in the future, it currently seems to have the greatest potential in the feed of livestock. The Dutch company Proti-farm has developed a production process designed for the food industry, aiming at a strong demand increase of insect-based meat. French start-up Jimini's is already selling bars, pasta and granola with insect protein.



Cultured meat / Lab-grown meat

The third trend in traditional meat substitutes is the production of cultured meat. Cultured meat is produced through taking stem cells from living animals and placed in bioreactors to proliferate fats through amino acids and glucose in which they multiply and form muscle fibres. To prevent future animal suffering, a Dutch start-up named Meatable found a solution in 2018 to extract the cells from the umbilical cord.

The first cultured burger cost \$ 250,000, whereas today we are at the point where price is only still a fraction. Although production is not yet for consumer use, it is expected that the first cultured meat will be in the supermarket within three years.

Innocent Foods in Germany (Lab-grown-mince), Higher Steaks (UK), SuperMeat and FM technologies (both Israel and lab-grown chicken) are other examples of lab-grown meat. Go to market for cultured meat products is expected within the next three years.

In the past years we have seen many young companies arise, with no legacy issues from previous activities or paradigms. But also, long existing companies show capabilities to cope with changing consumer demand. The Denmark based Hanegal A/S is a great example of how a business founded in 1980 is still very relevant by making continuous product changes but sticking to an identical mission. In Germany Rügenwalder Mühle (founded 1834 as a butcher-shop; € 212 mio. turnover in 2018) is transforming its business. The company is now market leader in plant-based meat substitutes with a wide range of meat-free alternatives to traditional German favourites like salami, meatballs, or schnitzel, whereas it was originally exclusively producing conventional meat products. By the end of 2020, approximately 40% of its total production is planned to be plant-based.

05.

The most disruptive trends

From a future M&A perspective, looking at the most disruptive substitutes and their ability to satisfy key success factors will drive acquisitions and investments from VC's. Below, we highlight three factors that we believe are most determining in becoming the future leading alternatives in the meat industry and hence will see most interest from investors.

Input materials and conversion ratio

- The current meat industry is faced with difficulties to reducing cost prices further due to input materials and lowering feed conversion rates;
- Traditional meat already operates near its limit in terms of efficiency;
- Cultured meat, insect-based food and vegetarian plant-based food have the potential to increase bottom line conversion rate to produce proteins;
- Vegetarian plant-based food consists uses similar amounts of input materials alike energy and water, but resulting in significantly higher output quantities;
- Input materials for cultured meat mainly consist of amino acids and glucose, which are relatively inexpensive.

Scalability and innovation

- Cultured meat is expected to benefit from increases in production scalability in the coming years;
- Dutch professor Post calculated that a 25,000-litre bioreactor could eventually produce 350,000 kg of cultured meat per annum, which equates to annual meat consumption of ten thousand Europeans⁵;
- Compared to meat production, only a fraction of agricultural land is needed.

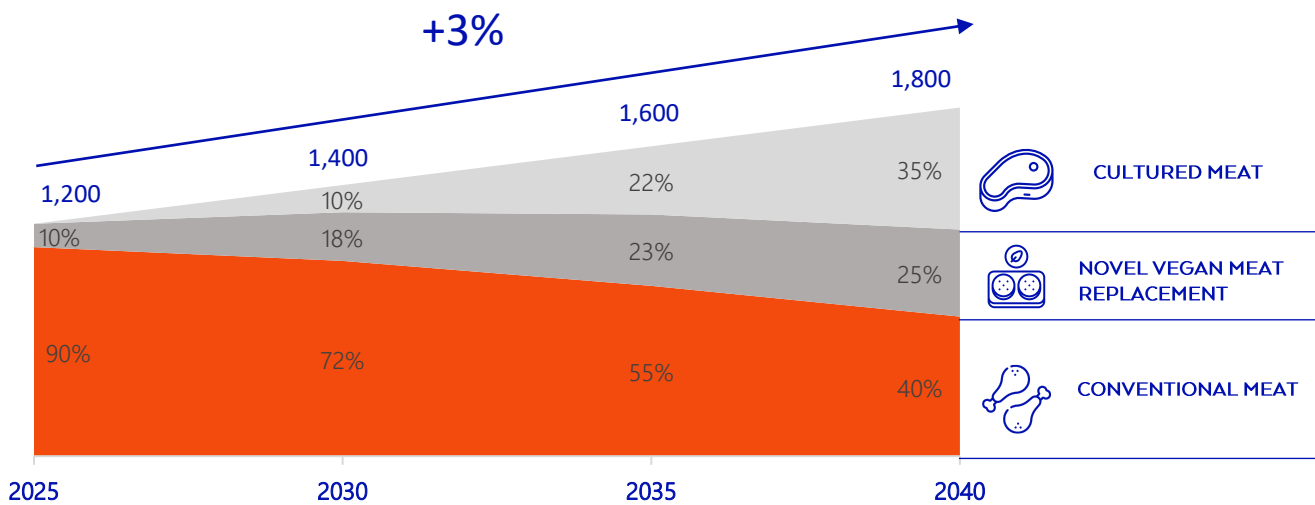
Consumer acceptance

- The intensity of the livestock industry is becoming a hot social topic;
- The number of consumers demanding a zero-tolerance policy against animal harm is increasing;
- Consumers are attributing more value to the sustainability of mother earth, and with rising public awareness of meat substitutes and their potential to significantly reduce required water and land use, food demand is shifting. Furthermore, substitutes lower the effects on global warming.
- Increasing product features on vegetarian plant-based alternatives;
- Cultured meat allows for customisation of taste to consumer preferences.

According to AT Kearney, cultured meat and vegetarian plant-based alternatives have the most disruptive effect on the current meat industry. The figure below from AT Kearney shows the future consumption of the three types of meat. By 2040 only 40% of the total meat consumption will be conventional meat.

⁵ <https://www.volkskrant.nl/kijkverder/2018/voedselzaak/artikelen/kweekvlees-is-hard-op-weg-naar-uw-bord/>

Global meat market forecast (in \$ bn, global)



As can be seen in the graph above, the overall meat industry is a growing market, amongst other things, due to the projected growth in worldwide population. The two presented alternatives, cultured meat and vegetarian plant-based food, are growing markets within this growth market. Traditional meat is expected to fall to around \$ 720 billion by 2040, compared to around \$ 1.080 billion in 2025. Meat producers are not unaware of these industry developments, hence their heavy response in the field of M&A.

06.

Current and future M&A activities

Since the last few years, there has been a surge in the number of M&A transactions in the Agri and Food sector. Throughout the chain we observe acquisitions governed by the desire to, engage in new revenue streams to protect market share and (seed) investments to accelerate innovation and scalability for new disruptive alternatives in the conventional meat industry. These developments in M&A underline the strategic transformation that the industry is currently undergoing and prove the above-mentioned key value drivers at both a strategic and M&A level on a global scale.



M&A related to Plant-based alternatives

Total funding up to 2018 amounted to more than \$ 900 million for vegetarian plant-based alternatives. One out of many examples is the IPO of American based Beyond Meat in 2019. This company produces plant-based meat alternatives such as burgers from plant-based proteins. Since the IPO, its share price has risen from \$25 per share (with a valuation of \$1.46 billion) to over \$135 per share at the time of issuing this report. The main reason for this is simple: expected growth by entrancing and disrupting the conventional meat industry. As the sales growth also shows, this true potential does exist. Beyond Meat turnover increased from more than \$16 million in 2016 to \$298 mio. in 2019 and aims to achieve \$ 490 mio. in 2020 according to the companies' outlook presented February 2020.

Visible market developments are global, as can also be seen in the fact that the French company Roquette (€ 3.5 billion annual turnover) contributed to the growth of Beyond Meat, given that Roquette is a producer of vegetal protein and recently concluded a multi-year commercial agreement to secure a protein pea supply chain to North America. Roquette has invested € 500 mio. over the last 5 years to build 2 new plants in Canada and France.

These plant alternatives target flexitarians - who represent 39% of the French population - and more generally all consumers who wonder about the impact of their food on their health and the environment. To democratize the development and access to healthy and delicious vegetable meat "Made in France", the start-up Les Nouveaux Fermiers, founded in 2019, secured € 2 million in funding to boost its production and accelerate its distribution throughout restaurants and consumers.

In Spain the company Foods for Tomorrow has focused on the production of vegetable meat. The company is known for Heura, a truly vegetable product which resembles meat flavour.

German based Like Meat (founded 2013) plant-based sausages, chicken and kebab are already on sale in 10 European countries.

Irish Kerry-Group (€ 6,6 bn. in 2018) acquired Dutch plant-based protein manufacturer Ojah BV for € 20 mio. in 2018. Ojah manufactures textured meat alternatives that are suitable for meat and fish substitutions.

As for Japan, the alternative meat market gained greater attention in 2019 when Japan's two largest meat processing companies announced plans to develop their own line-ups of alternative meat products with a roll-out for commercial sales early 2020. Planned items include plant-based hams, sausages, and gyoza (fried dumplings). As a result, industry sources report that sales of alternative meat products in Japan could double to reach \$ 312 million annually by 2023. Another meat-free trend to be considered during 2020 is the use of seaweed as the main ingredient for products such as noodles, snacks, or butter.

M&A related to Cultured meat

Although plant-based alternatives are available in the market at large scale, cultured meat activities are still in their early days, demonstrated by the large number of seed investments from VC's, as opposed to acquisitions by strategic players.

The purpose of these seed investments is stimulated innovation and set up for scalable production at lower production cost.

With the absence of large volumes, yet cultured meat is still relatively expensive compared to traditional meat. In addition, companies who process cultured meat into finished products are largely dependent on a handful of suppliers for their supply of raw materials and ingredients. In many cases, ingredients are not yet available in large quantities.

Premature technology in production is a main driver for this, but we expect to see a move towards larger production capacity driven by new technology and available capital from VC's. It should be noted that the construction of large bioreactors and/or go-to-market campaigns in consumer markets require heavy investments.

The trend is illustrated by Dutch developer and producer of cultured meat, Mosa Meat. The company targets its consumer introduction by the end of 2022, enabled through seed investments in early 2020 from Lowercarbon Capital and animal nutrition producer Nutreco⁶. In 2013 this company made it to world news when he presented the first cell-cultured hamburger.

Nutreco's involvement as financial investor is noteworthy, particularly since most investments in the early stages in new companies are typically from venture capital and private equity parties. Nutreco is a supplier of certain ingredients to produce cultured meat. The example shows that strategic parties are apparently keen to invest in companies that operate lower down the value chain, aiming at the long-term supply of raw materials in this segment.

Several seed funding rounds were recently raised for cultured meat innovations. We expect this trend to continue in the short term. For the medium-term investments related to commercial roll-out and scaling of production volume and reducing production cost are expected. In addition, we expect further consolidation in the chain when this commercial roll-out takes place.

⁶ <https://www.fooddive.com/news/mosa-meat-gets-investments-and-support-to-bring-cultured-meat-to-europe-in/570236/>

M&A related to Conventional meat producers

Traditional meat producers are likely to see their part of the market decline from \$1,080 billion in 2025 to \$ 720 billion in 2040, despite the fact the demand for meat (including meat substitutes) is expect to clime to \$ 1,800 billion by 2040. In other words: the share of traditional meat is forecasted to shrink from 90% in 2025 to 40% in 2040.

To ensure continuity, traditional meat producers are scrambling to look for new revenue streams. Not all companies have the right skill set or are equipped to facilitate innovative processes so far out of their comfort zone. In addition, it requires heavy investments and specific knowledge. It might be-easier and more successful to hunt for these alternatives by the time these are ready for commercial roll-out.

At present the traditional meat industry is involved in many M&A transactions related to plant-based (meat) alternatives and diversification into other food products such as salad meals. It appears that the meat industry is in the process of transitioning to adept to the new playing field. One of the Netherlands's larger meat producers, Van Loon Group, was engaged in several M&A transactions in recent years. In 2019, it bought Dutch company Enkco, a producer of chilled and frozen products containing both meat and vegetarian and vegetable meat substitutes. The Group stated that it will add 30% more vegetables in the future to meet the growing consumer demand for vegetable proteins.

Dutch Plukon, one of Europe's largest players in the poultry market, has taken a majority stake in Dutch Fresh Care as of January 2020.

This company specialises in fresh sliced vegetables, vegetable mixes and meal salads and has over 400 employees. With the takeover, Plukon aims to expand the already existing market for fresh meals.

In addition, meat producers are focusing on the development of their own plant-based brands and production. Spain, a country known for its meat consumption, has two good examples regarding this transition. Noel Alimentaria, one of the biggest Spanish producers of meat, has created a product line for vegetarian charcuterie to satisfy consumers demand. A Catalan local example is Vall Companys, a meat producer that has created Zycular Foods, a firm specialised in the production and sale of plant-based food as an alternative to meat. The owners' aim is to become one of the Spanish leaders in plant-based production.

Germany's No 1 poultry producer PHW-Group has a sales partnership with Beyond Meat and acts as their exclusive sales partner in Germany. With the Israel start-up SuperMeat (lab-grown chicken) PHW has agreed a partnership as well and is invested in Live Kindly (formerly known as Foods United)- which aims to build-up a portfolio of plant-based food-companies. The plant-based meat-company Like Meat is already part of this portfolio.

Although some of the conventional meat producers seem to be switching or complementing new revenue streams and alternative product categories, there are also conventional meat producers who are holding their ground. The German Tönnies group, Germany's largest conventional meat producer with a annual turnover of € 6.7 bn, announced in 2018 that it will stick to conventional meat. However: in January 2020 Tillman's, daughter company of Tönnies, launched vegan minced meat and burgers for a German supermarket trade brand.

Conclusions

These are the main conclusions that can be drawn from the described trends and examples:

- A. **Increase in M&A activities** - It is clear that the degree of present day M&A activities is a strong indicator for significant further capital investments into the meat industry and within the industry from conventional meat producers to alternative meat products.
- B. **Conventional meat producers are transitioning** - As of yet, many acquisitions have taken place by meat producers in classic vegetarian alternatives to attract new revenue streams.
- C. **Cultured meat is catching up** - Cultured meat still requires substantial development to become scalable and profitable. It is no surprise that we see mostly seed and early stage investments from VC's who are willing to engage into innovative but high-risk business models. This may result in a shift towards more scale-up type of investments within 5 years, and as conventional meat producers are preparing for transition, an uptake can be expected of acquisitions of cultured meat by strategic investors, albeit in the longer run.
- D. **No clear winners yet** - On company level, it is hard to predict what the winners will be. As with any new product revolution, there is a fine line between the moment to enter the market to be the first, or to choose to further develop products and become the best. Whoever finds the best mix in timing, scaling, product quality (taste and nutritional value), pricing and environmental sustainability has the best hand to be a winner.

A selection of companies in the meat alternative sectors

PLANT-BASED

Beyond Meat (US)

Impossible Foods (US)

Pacific Foods (US)

Roquette Frères Le Roman

(FR)

Like Meat (DE)

Moving Mountains Food

(UK)

Mornistar Farms (US)

CULTURED MEAT

Mosa Meat (NL)

Appleton Meats (CA)

Meatable (NL)

Memphis Meats (US)

Future Meat Technologies

(IL)

Aleph Farms (IL)

Higher Steaks (UK)

INSECT BASED (FOR FEED OR FOOD)

Ynsect (FR)

Protix (NL)

Aspire Food Group (US)

EntomoFarms (CA)

Jmini's (UK)

Swarm Nutrition (DE)

InnovaFeed (FR)

Latest Transactions

IRELAND 04/2020	UNITED KINGDOM 01/2020	IRELAND 06/2019
<p>Mabon</p> <p>Mabon Public Cash-offer</p> <p>Agromino</p>	<p>A Pearson Holdings Limited</p> <p>Re-finance with</p> <p>Shawbrook Bank</p>	<p>Fresh (The Good Food Market)</p> <p>has acquired</p> <p>BWG Foods</p>
Buy-side	Capital Raise	Sell-side
ARGENTINA 08/2019	ARGENTINA 08/2019	ECUADOR 04/2019
<p>Verónica S.A.I.C.I.A.F. e I.</p> <p>Liability Management</p> <p>Various Banks</p>	<p>Local Private Investors</p> <p>Sell of 100% of the shares of P.F. Chang's Argentina</p> <p>Asian Bistro Argentina S.R.L.</p>	<p>Corporación Favorita</p> <p>has acquired</p> <p>Hanaska Catering</p>
Capital Raise	Sell-side	Buy-side
ARGENTINA 02/2019	UK 01/2018	JAPAN/ECUADOR 01/2018
<p>Adecoagro S.A</p> <p>Sale of the Chivilcoy and Morteros industrial facilities and the Las Tres Niñas and Angelita brands</p> <p>Sancor Coop. Unidas Lta</p>	<p>APS Group</p> <p>received an Investment from</p> <p>Business Growth Fund (PE)</p>	<p>Air Water / Saveur</p> <p>Proventus advised the shareholders of Ecofroz on a majority stake to Air Water Japan</p> <p>Ecofroz</p>
Sell-side	Capital Raise	Sell-side

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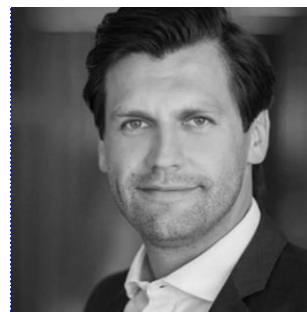
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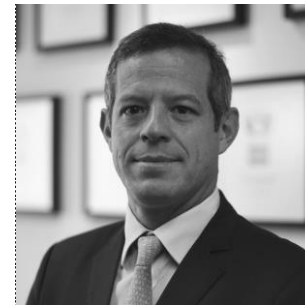
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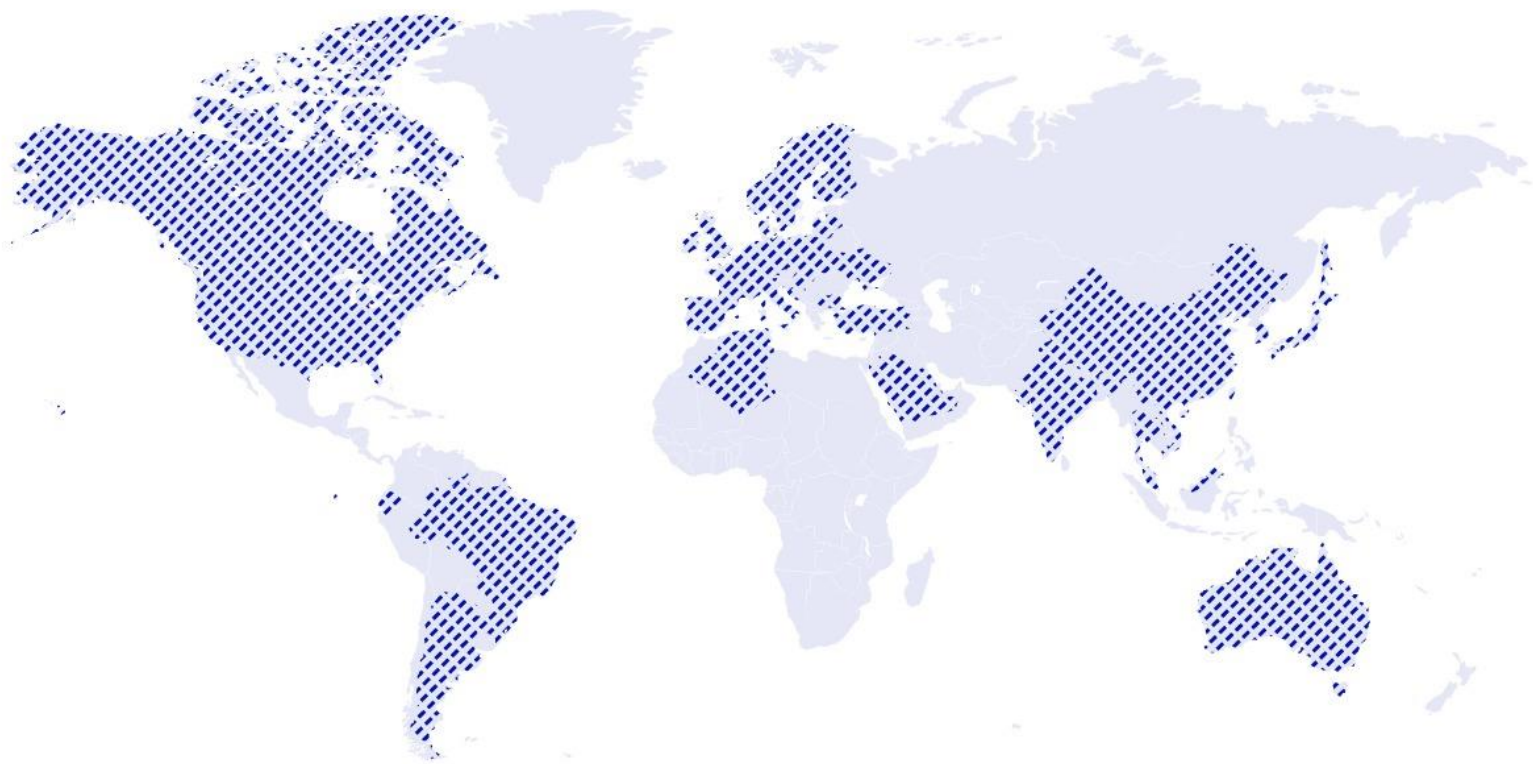
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