Trends in the Omega-3 Market

September 23, 2013

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Let's look at the supply side of the market first.

Sustainability and availability of oils are big issues with marine oil supply.

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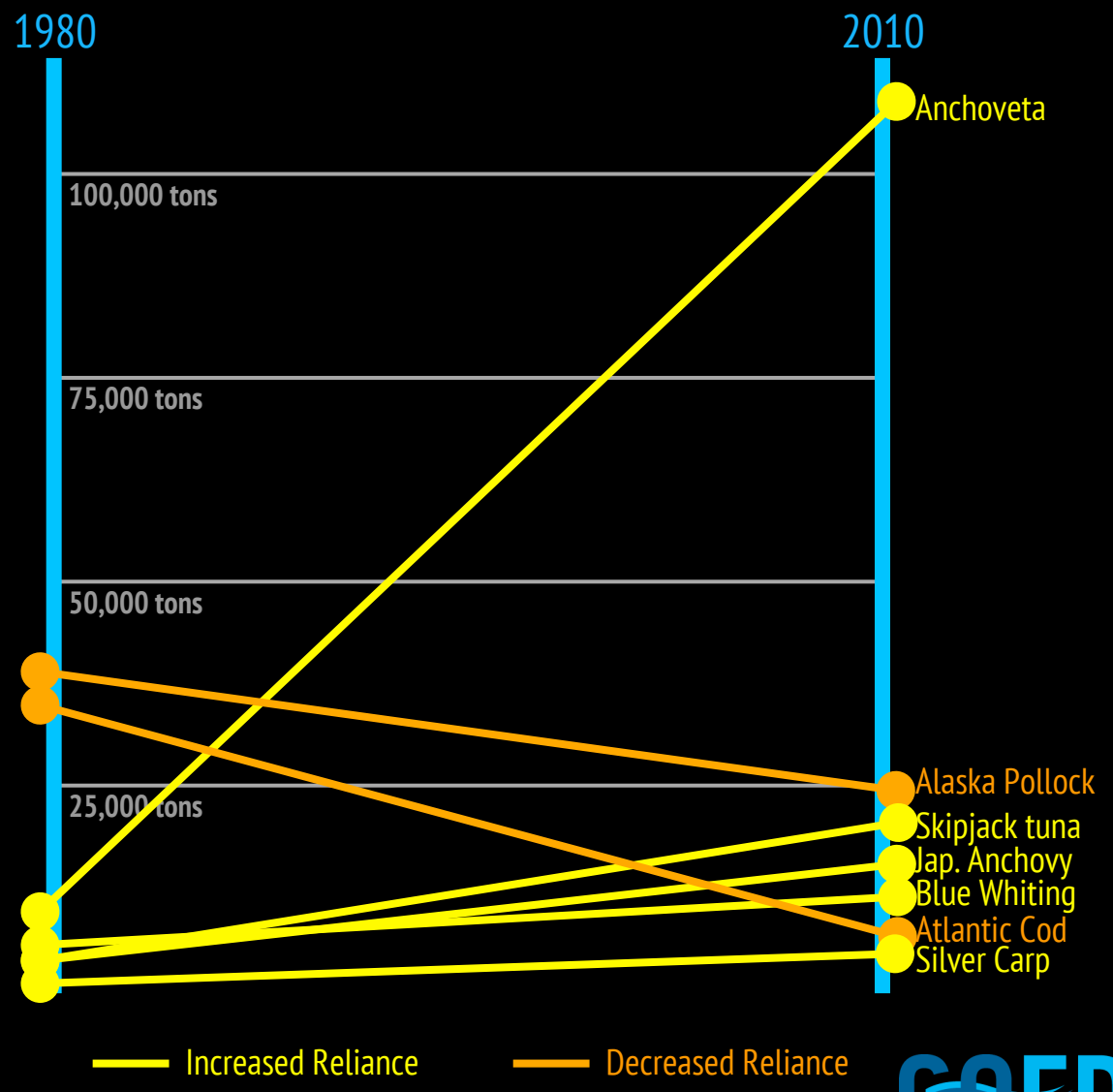
We know that fishery capacity of EPA and DHA is already changing and that we are more reliant on fewer fisheries for these nutrients, the anchoveta fishery in particular.

30-Year Change in EPA and DHA Capacities of Leading Fisheries



Source: GOED analysis of FAO and USDA data

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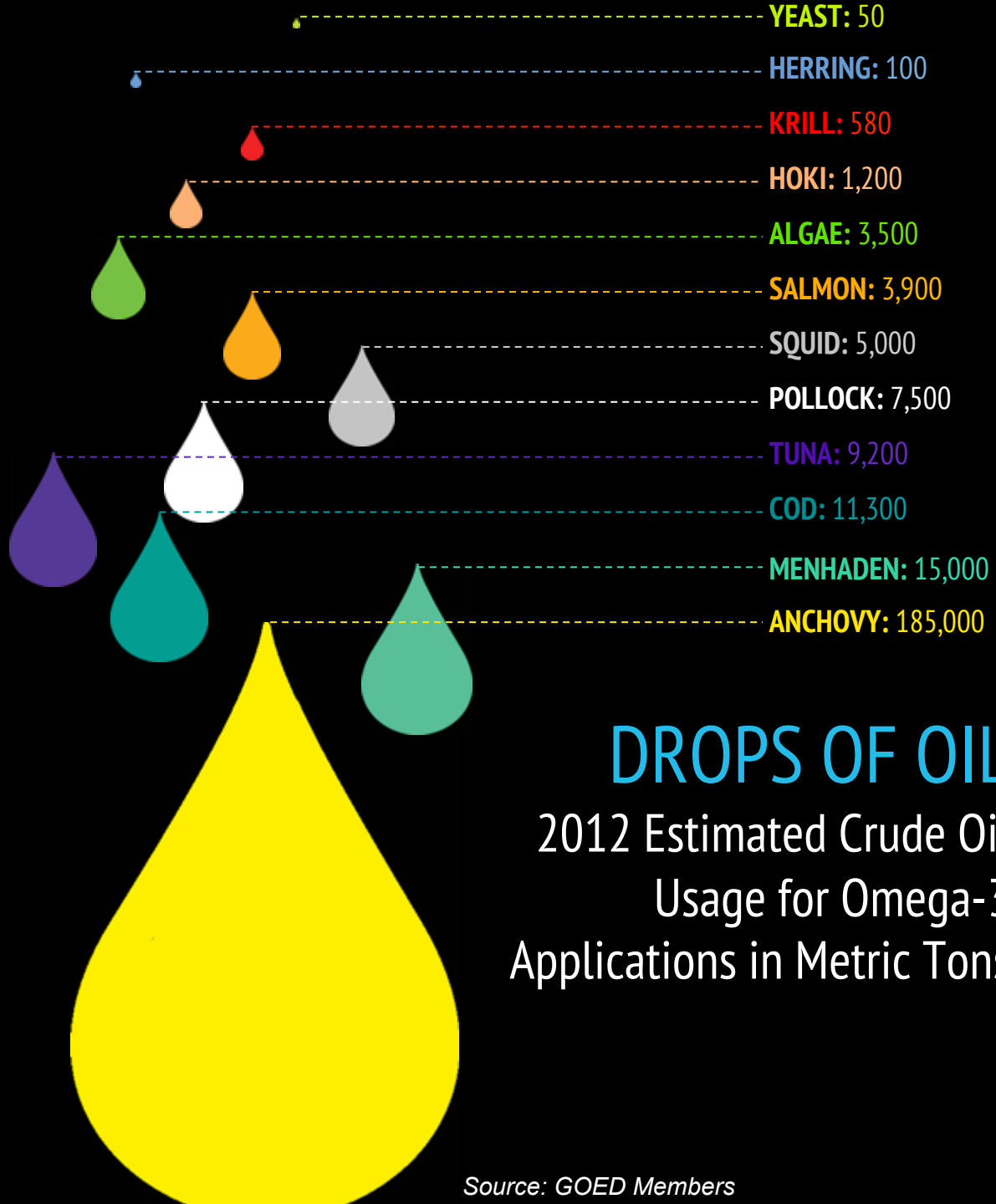

DROPS OF OIL

2012 Estimated Crude Oil Usage for Omega-3 Applications in Metric Tons

Source: GOED Members

It is no secret that understanding of omega-3 supply trends is tied intimately to the anchovy fisheries

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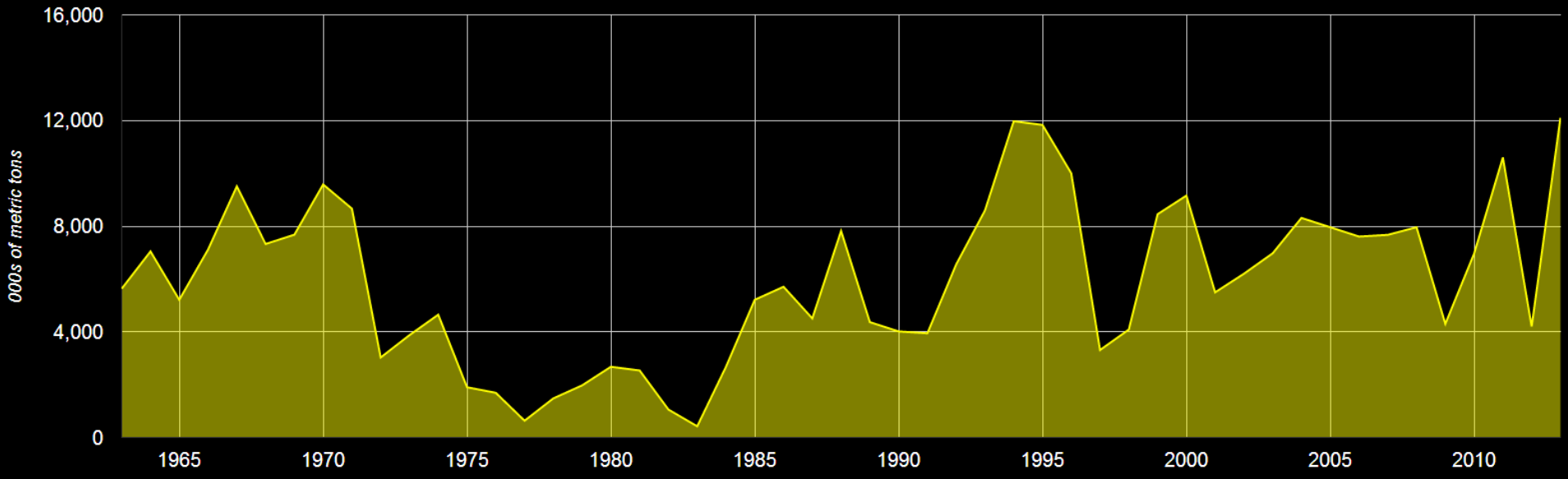
The Peruvian Anchoveta fishery has suffered in the past from poor management, but has recovered due to successful, aggressive action

Spawning Biomass of Peruvian Anchoveta, 1963-2013



Source: IMARPE

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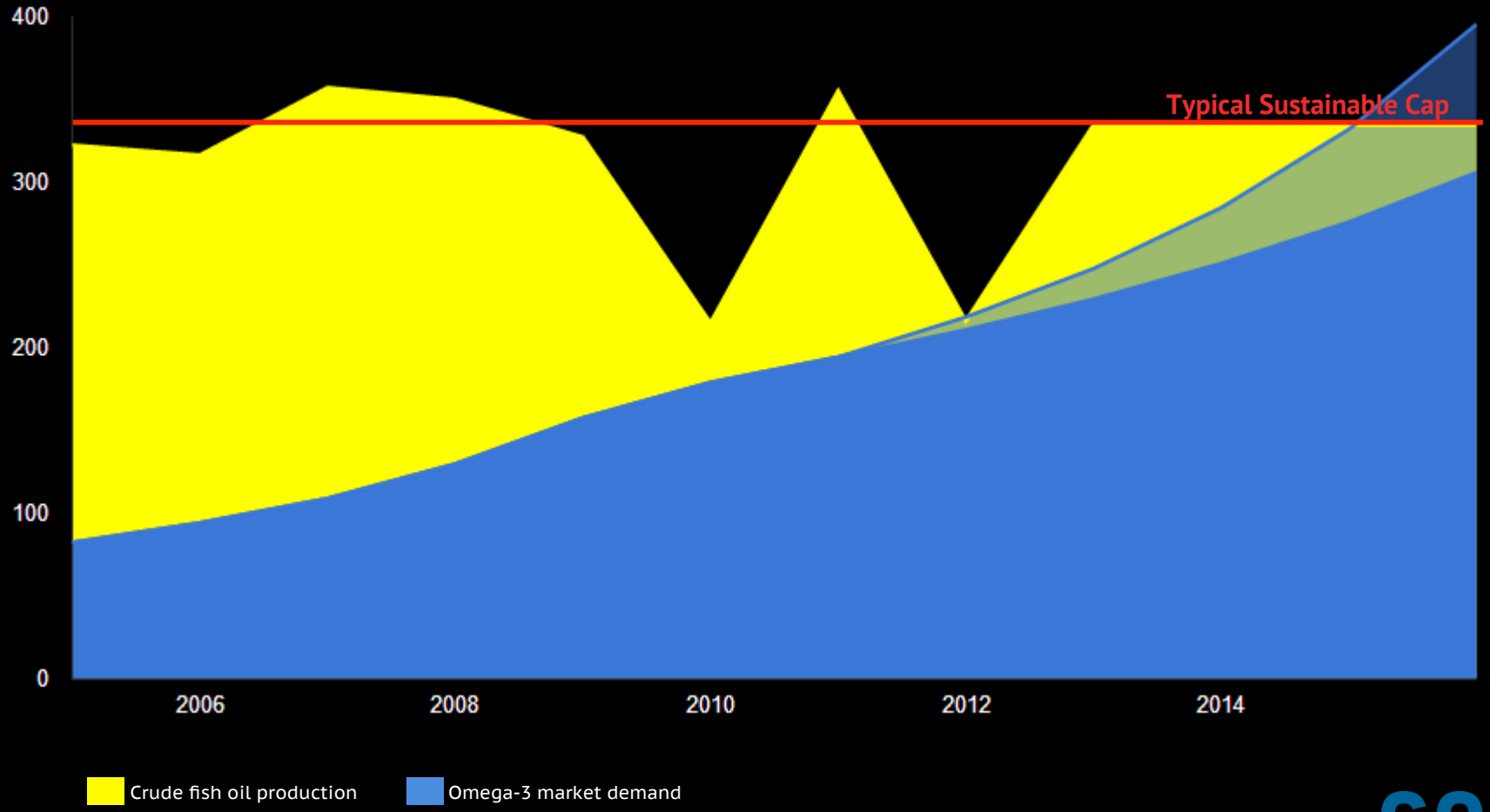
We have presented data in the past on an impending supply shift as a result of demand increasing beyond the anchovy capacity

Crude Anchovy Fish Oil Production and Omega-3 Market Demand

(in 000s of metric tons)



Source: International Fishmeal and Fish Oil Organisation, Frost & Sullivan, GOED Analysis

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This is not a sustainability issue though.

This is the result of sustainable management of the fishery and growing demand for its products.

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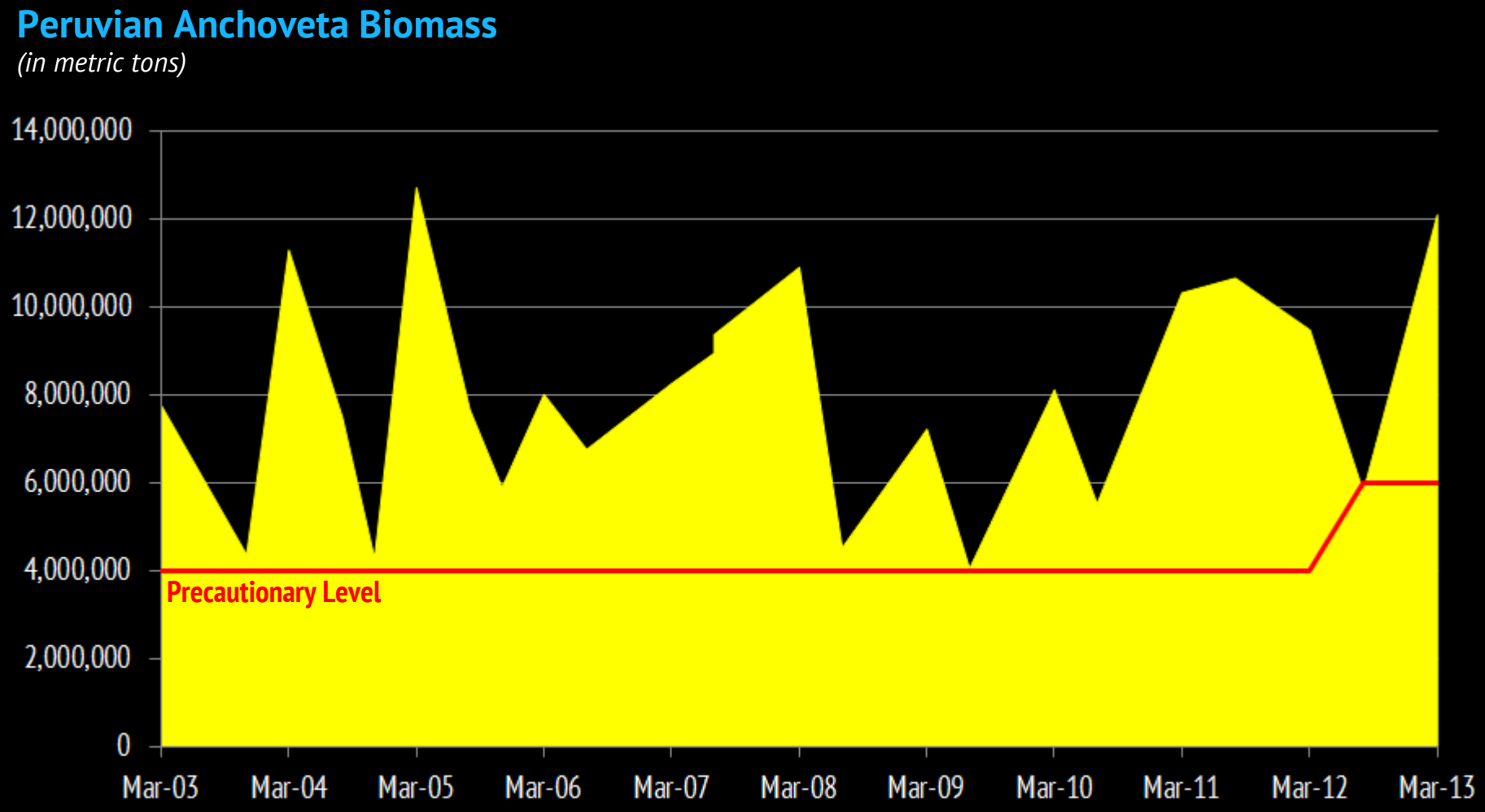
Since trigger levels have been introduced, the anchovy fishery has never fallen below them...and the triggers are even stricter now



Source: IMARPE

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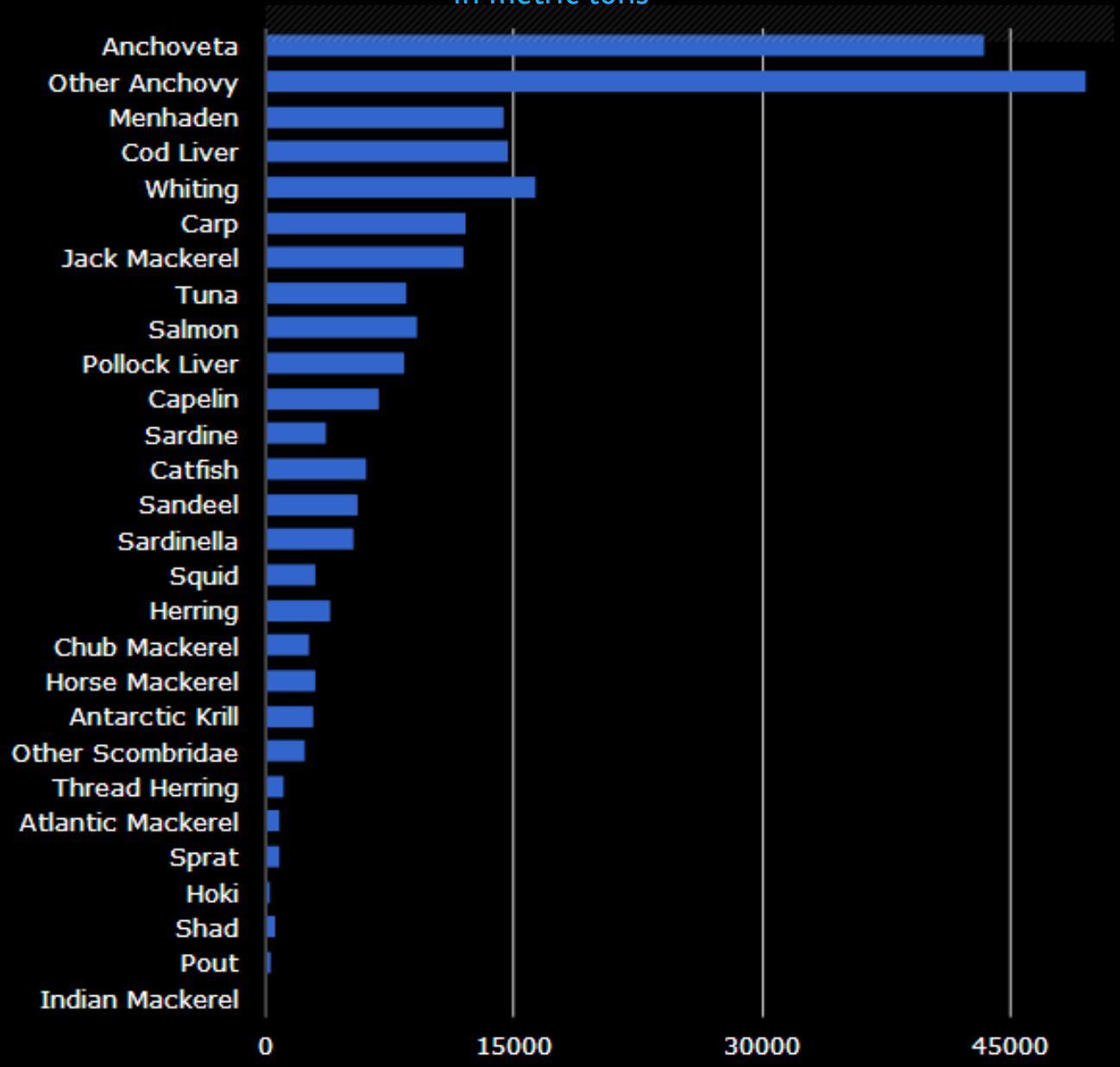
Available EPA and DHA Capacity from Selected Fisheries

in metric tons



Source: GOED Analysis of data from Anthony Bimbo

Many other fisheries can supply enough EPA and DHA to be attractive to the right omega-3 customers now, and we expect to see more of these oils

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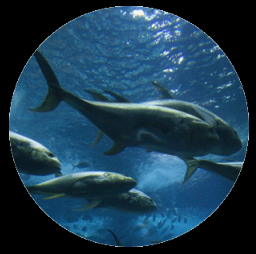
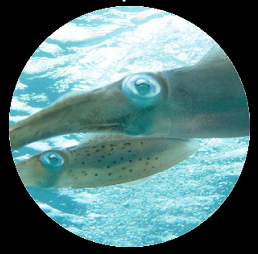
Commercially Available

Fish



Anchovy
Sardine
Mackerel
Tuna
Cod
Salmon
Menhaden
Trout
Pollock
Hoki
Halibut
Sandeel
Angelfish
Saithe

Squid



Market Squid
Shortfin Squid

Zooplankton

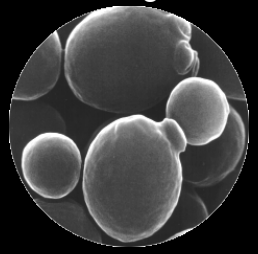
Antarctic Krill
Pacific Krill
Northern Krill
Calanus
Shrimp

In Development

Algae

Schizochytrium
Crypthecodinium
Euglena
Nannochloropsis
Phaeodactylum
Nitzschia alba
Aurantiochytrium

Fungi



Y. Lipolytica
M. alpina
Sap. diclina
Sac. kluyveri
C. elegans

GM Plants

Soybeans
Rapeseed
Brassica
Linseed
Rockcress

The list of omega-3 sources, both commercial and in research, is getting longer with new algaes, new fish and new zooplankton projects having been announced in the last six months

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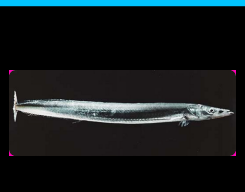
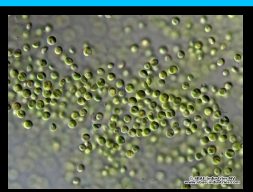
Krill | Salmon Roe | Herring Roe | Egg Yolk | Sandeel | Nannochloropsis



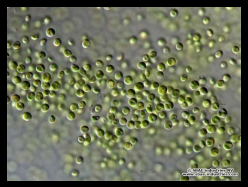


Phospholipid Path

New sources being launched will compete with anchovy oils.
Each of these new sources is launching with their own unique value proposition to differentiate from the dominant anchovy.

Shrimp | Nannochloropsis | Squid | Soy SDA

Triglyceride Path

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We also need to find new sources of EPA and DHA outside of the marine environment to close the broader gap and relieve pressure on fisheries.

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Algal sources of omega-3s are being researched in three predominant types of production systems

Fermentation

- Commercially producing DHA today
- High cost of capital
- Uses sugars as energy sources

Open-Air

- Limited production of EPA today
- High cost of capital
- Uses sunlight as energy source

Photobioreactor

- No commercial production today
- High cost of capital
- Uses sunlight as energy source

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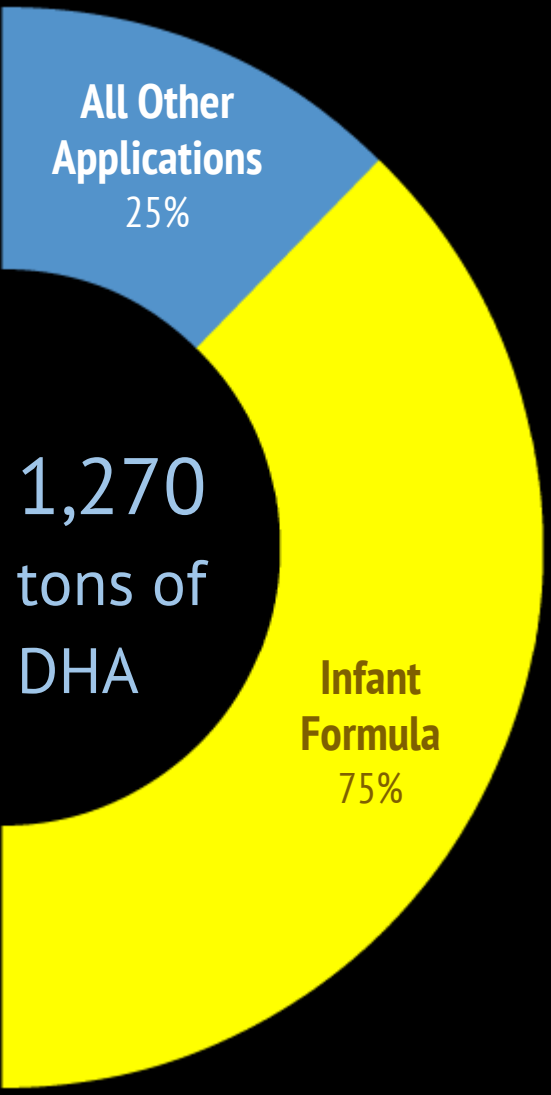

Most algal DHA is going into infant formulas and provides less than 0.2% of the world's omega-3 nutrition needs today.

Source: Frost & Sullivan report commissioned by GOED

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What is the potential of algae to fill demand that the oceans cannot provide?

It will depend on the economies of scale that these companies can achieve in order to displace their higher capital costs.

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Now let's look at consumers.

$25.4 Billion

Estimated Global Consumer Spending on Products Containing EPA/DHA Oils

Source: Packaged Facts

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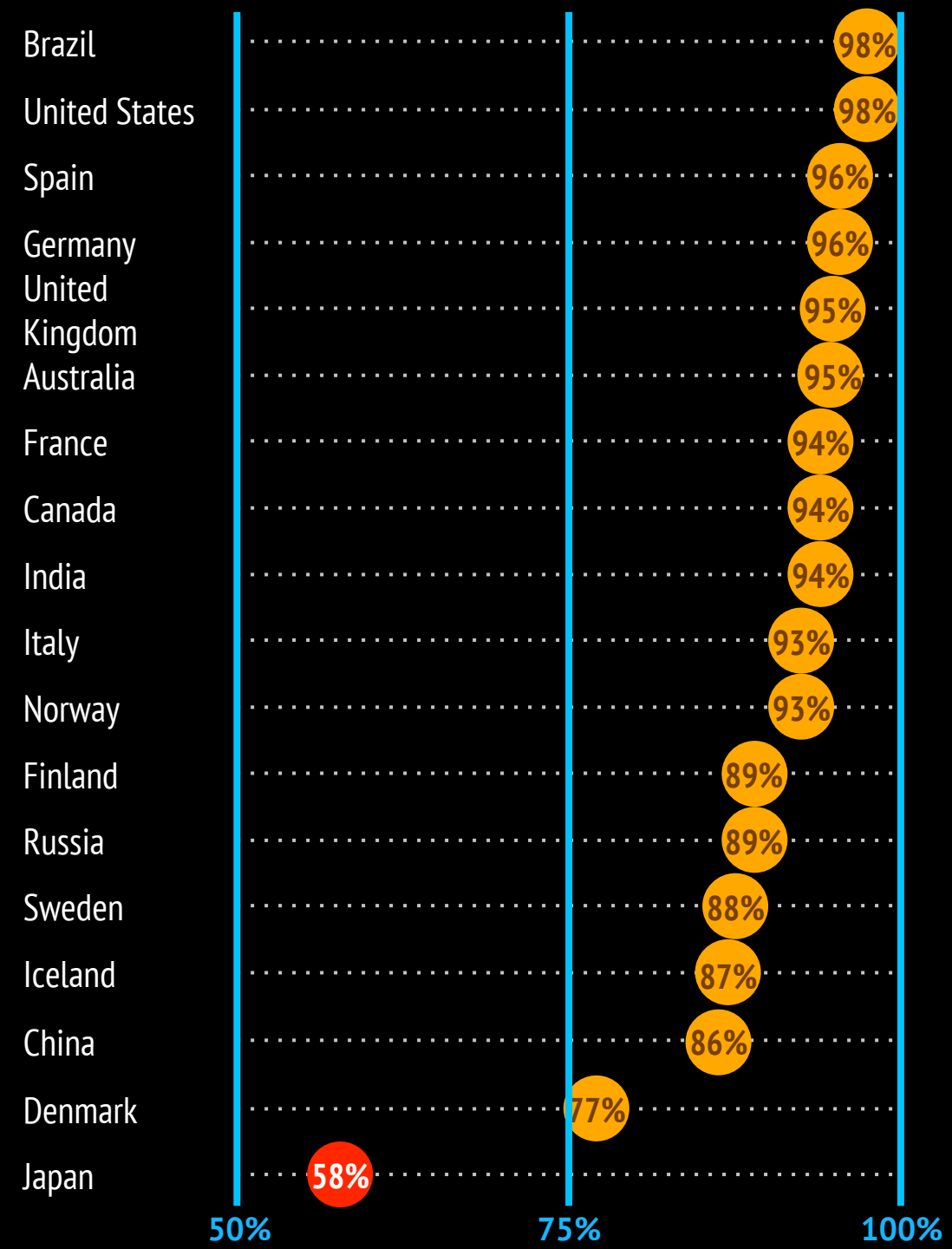

Let's start with consumer awareness.

Japanese consumers have the lowest awareness of omega-3s, DHA or EPA of any major economy, and surveys from Dentsu show it has been falling for nearly a decade.

Sources: GOED Proprietary Consumer Research, Leatherhead, YouGov

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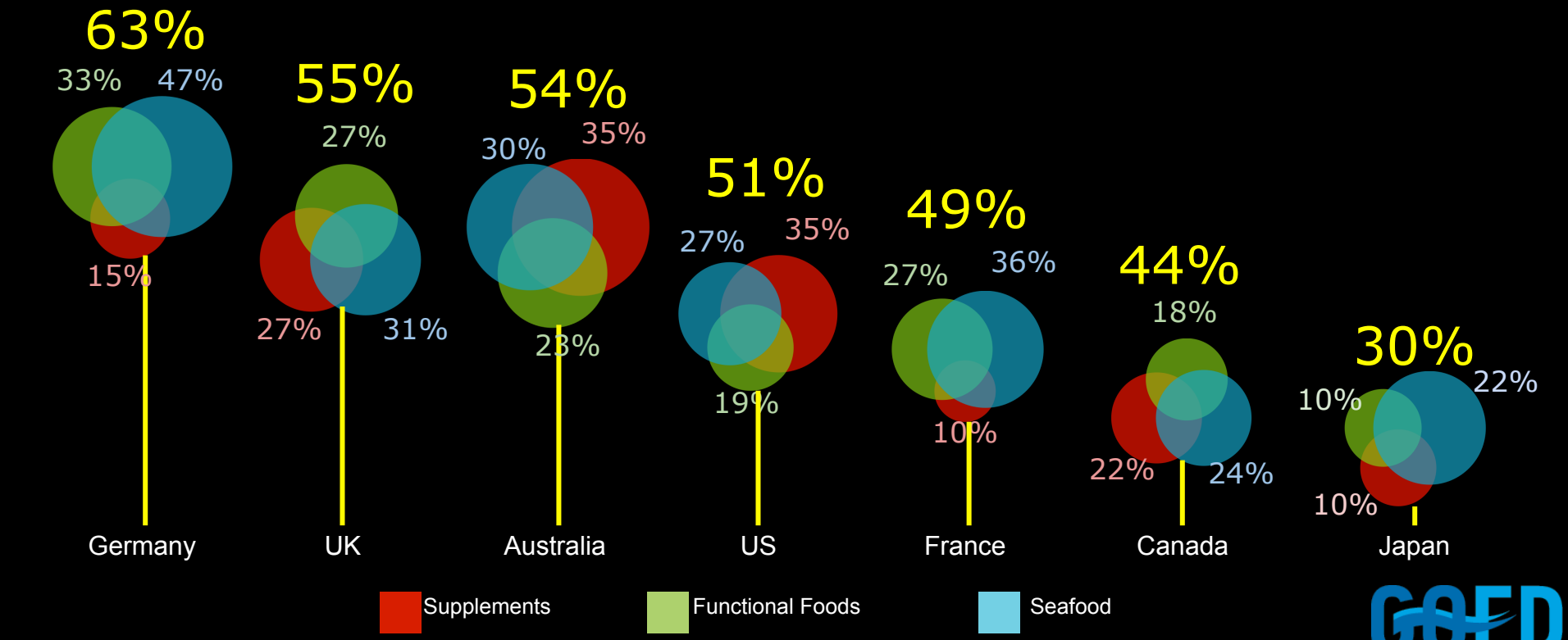
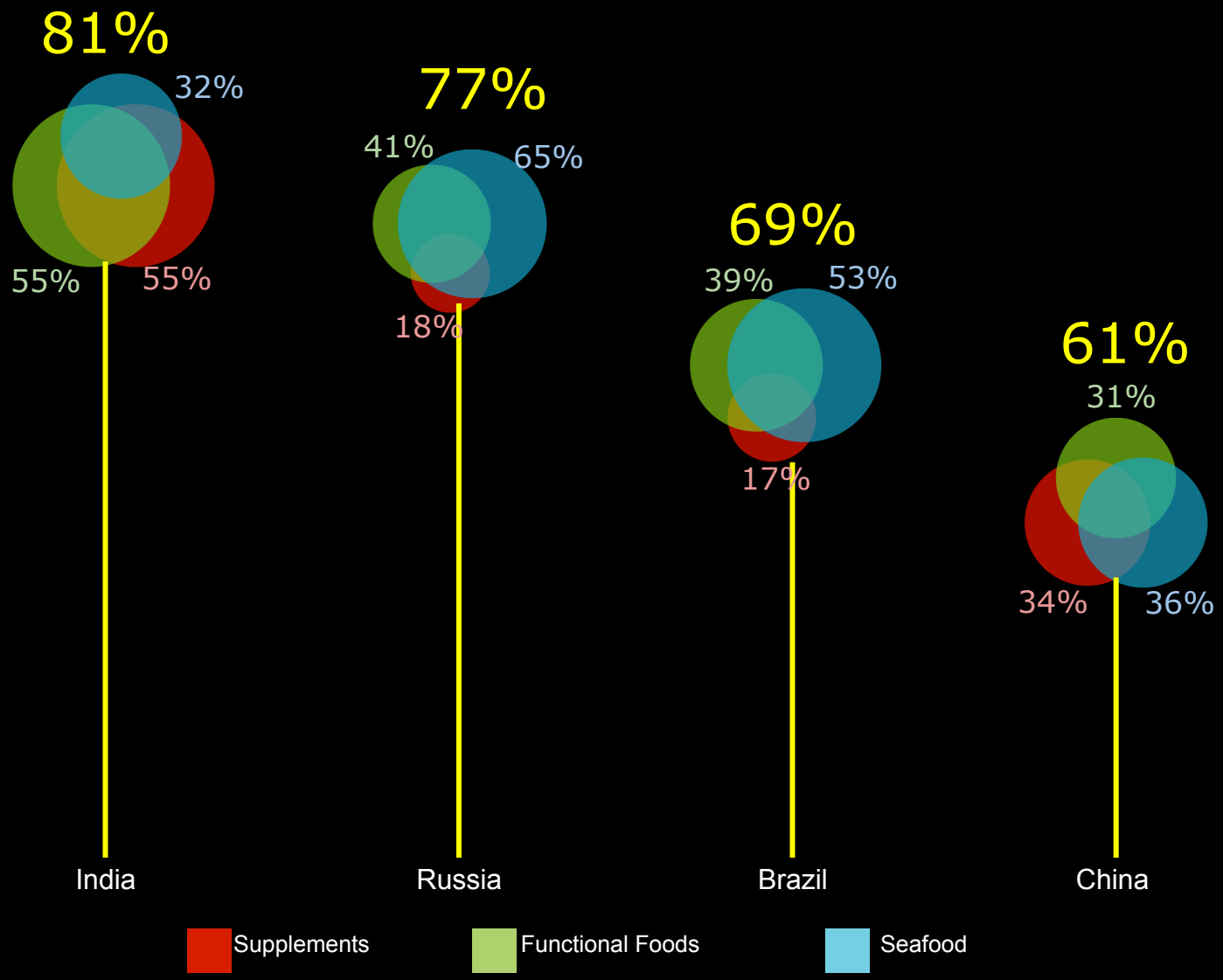
In developed countries usage rates are generally high when you consider all sources of omega-3s, but supplements are not always a main driver



Source: GOED Proprietary Consumer Research

The BRIC countries are interesting because of their high acceptance of omega-3s and recently gained economic power



Source: GOED Proprietary Consumer Research

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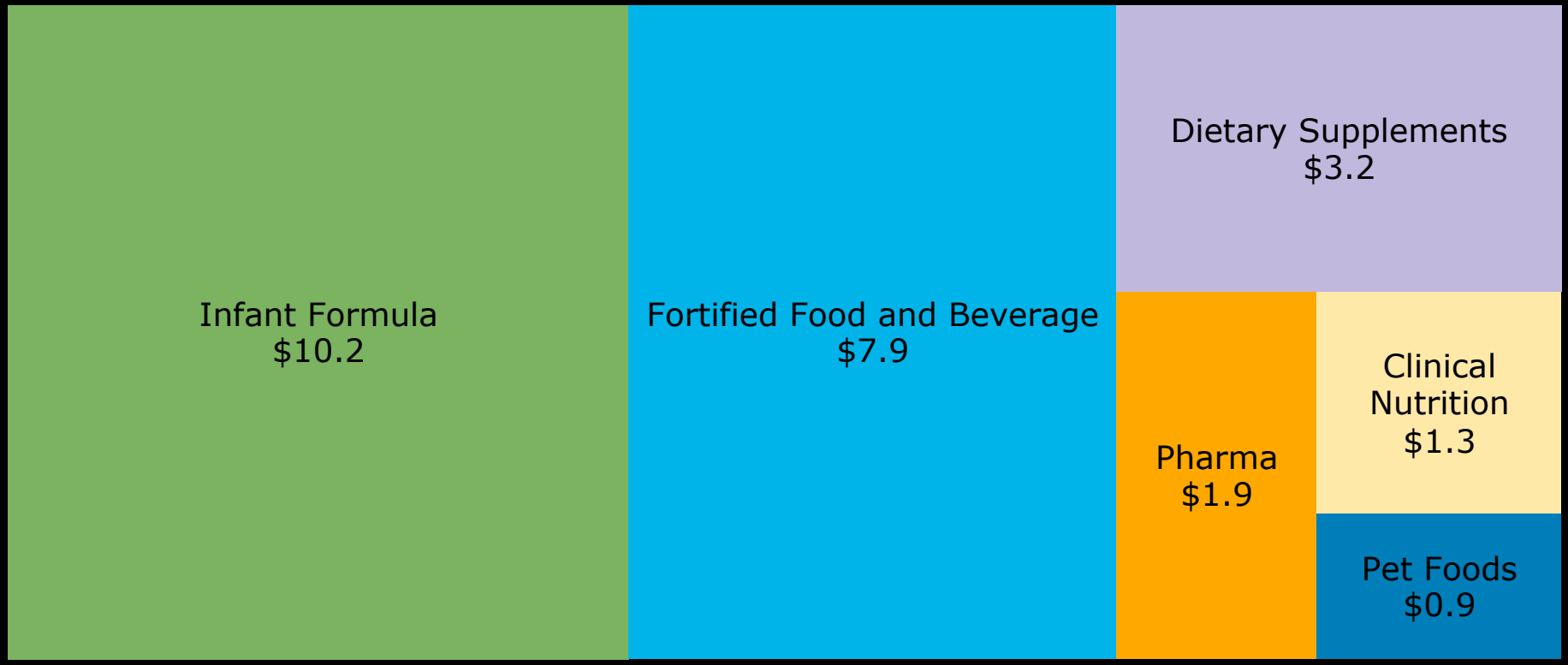
Lastly, let's look at how market trends are affecting the omega-3 supplement market.

The pharmaceutical market is ultimately the one to watch here.

Consumers actually spend more on EPA and DHA fortified foods than supplements or pharmaceuticals

Global Consumer Spending on EPA & DHA Omega-3 Products, 2011

Billions of US$



Source: Packaged Facts

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However, these foods contribute much less EPA and DHA to the diet than supplements

Global Consumption of EPA & DHA Oils in Consumer Products, 2011

Metric Tons

Source: Frost & Sullivan

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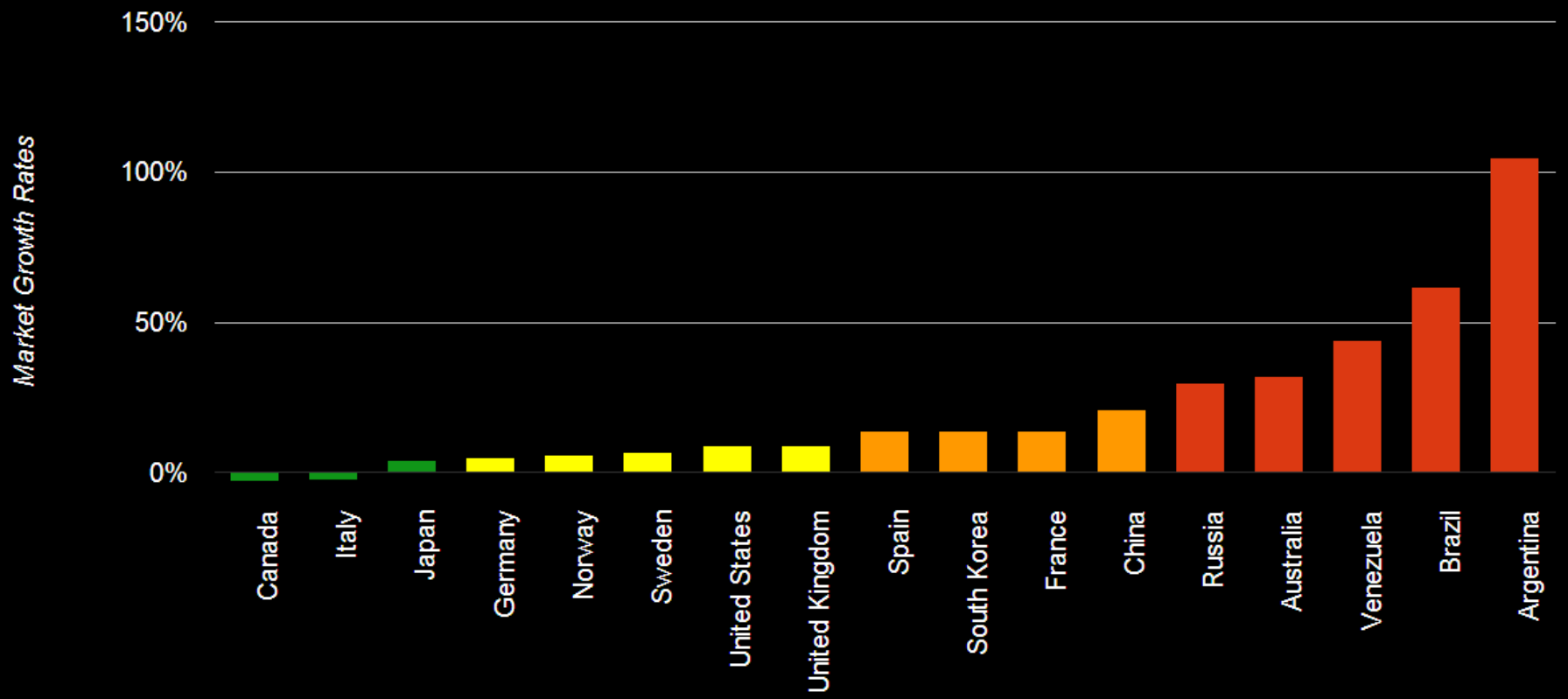
Globally growth in the supplement market was reasonably strong last year

2012 Omega-3 Market Growth Rates as Reported by GOED Members



Source: GOED Membership

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What is happening in the omega-3 pharmaceutical market?

This market is only just beginning and its growth will depend on new product launches.

EPA and DHA omega-3s have become attractive targets for new pharma products

38

Pharmaceuticals or pharma targets in development or on the market using EPA and/or DHA omega-3s

14

Companies that are publicly looking into new pharma targets using EPA and/or DHA

21

Health indications being targeted by these new and existing pharma products

Source: GOED Analysis

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However, only 3 of the 38 pharma targets using EPA/ DHA have been launched

Epadel

Mochida Pharmaceuticals

- 97% EPA product
- For treatment of arteriosclerosis obliterans and hyperlipidemia
- Only sold in Japan to date
- Generic competition now allowed

Omacor

Pronova Biopharma

- 85% EPA and DHA product
- For treatment of very high triglycerides
- Sold in 57 countries under the Omacor, Lovaza, Zodin, Eskim, Esapent and Seacor brand names

Vascepa

Amarin Corporation

- 97% EPA product
- For treatment of very high triglycerides
- Launched in Q1 2013 for sale in the US

Source: Company filings

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This has significant implications on incentives in the value chain

	 Crude Fish Oil Mfrs	 Oil Refiners & Concentrators	 Supplement Manufacturers	 Pharma Manufacturers
Situation	Finite supplies of oil, but increasing demand for their product	Margins are being squeezed and increases in scale have limited return	Every company sources similar oils, so it is hard to differentiate	Pipelines running dry; so they need high probability drug targets
Outlook	Pharmaceutical companies will pay the highest prices to secure supply	Pharmaceuticals offer a chance to displace some low margin demand	Pharmaceuticals may be a threat, but also lead to an educated consumer	Omega-3 mechanisms are understood, increasing odds of success

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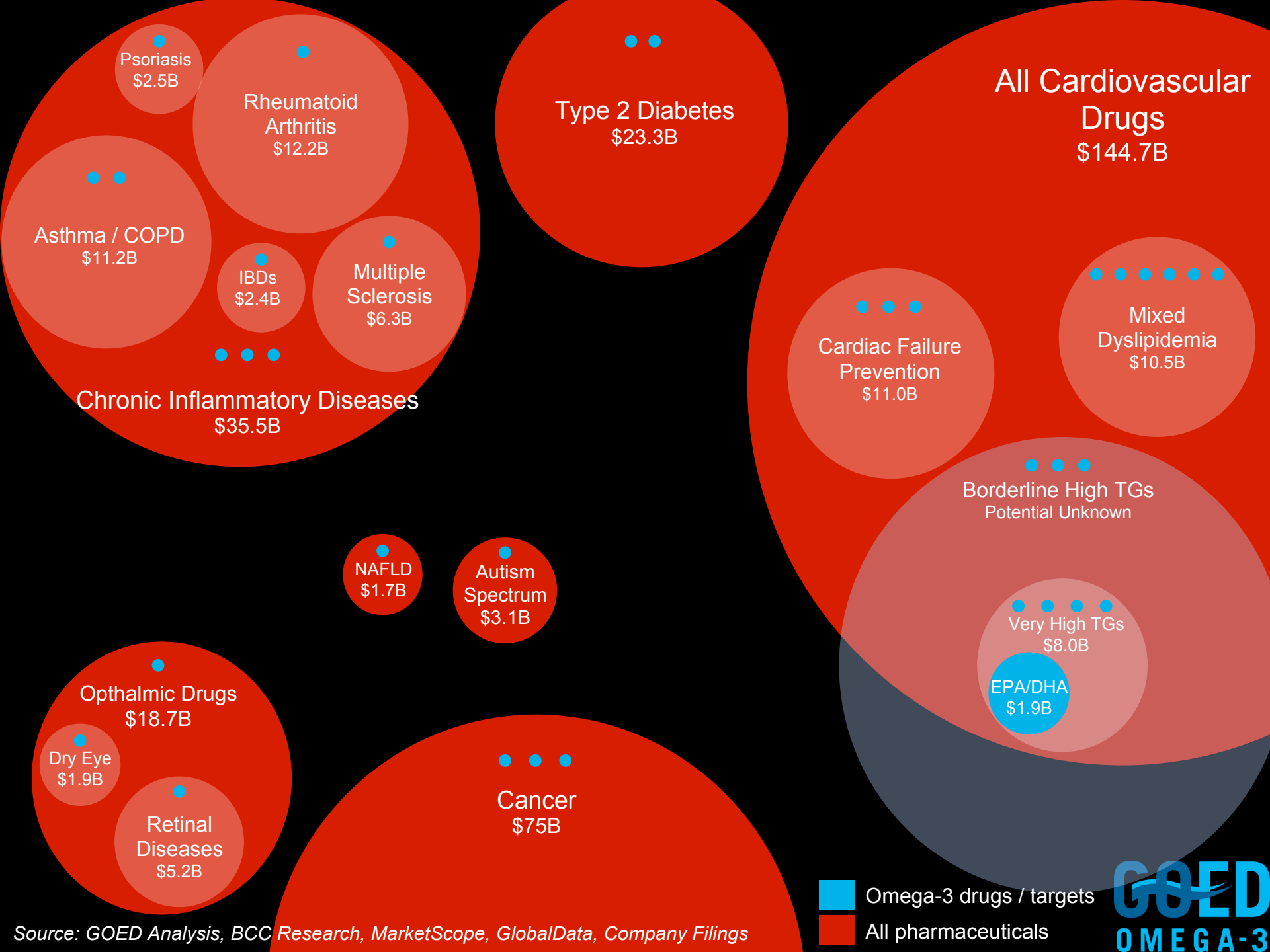

Source: GOED Analysis, BCC Research, MarketScope, GlobalData, Company Filings

What is the pharma market opportunity?

This is just speculation, but if omega-3s achieved the same penetration in these other indications as they achieved in the very high triglyceride market, the omega-3 drug market could reach more than $23 billion in global sales.

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Questions?

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