ERHVERVSMINISTERIET

Life science industry's economic footprint

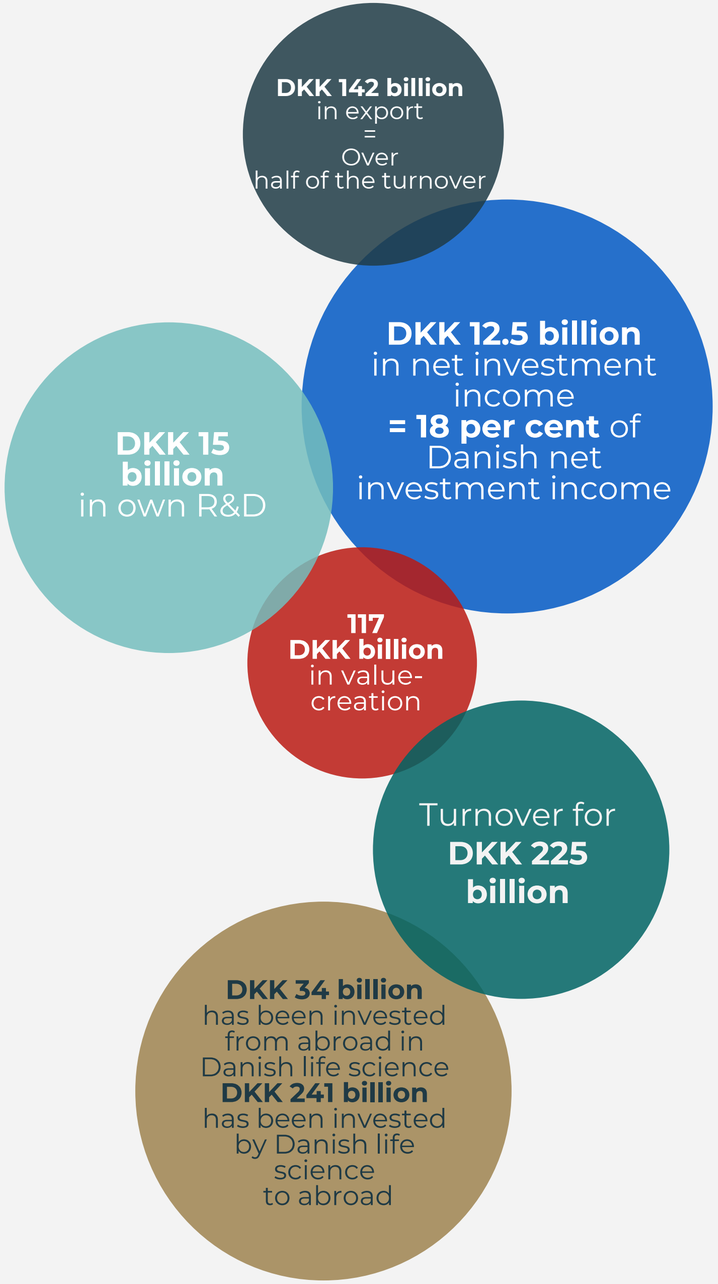
Ministry of Industry, Business and Financial Affairs, January 2021

Contents

Summary

The life science industry, a Danish position of strength with a major economic footprint

The analysis is based on the latest available data from Statistics Denmark, Danmarks Nationalbank and Eurostat. Data on the companies' turnover, tax, employment and foreign comparisons are from 2017, while it has been possible to obtain data for foreign investment and exports for 2019.



The main results of the analysis include:

- The life science industry invested DKK 15 billion in own research and development (R&D), which accounted for more than a third of all R&D in the private business sector in Denmark in 2017.
- The life science industry had a turnover of just over DKK 225 billion in 2017, of which exports accounted for just under half of the turnover that year.
- In particular, exports and Danish investments in life sciences abroad have seen significant growth since the last calculation in 2018. The life science industry has almost tripled its exports in the last 10 years, and in 2019, its exports totalled DKK 142 billion, corresponding to 19 per cent of goods exports in Denmark.
- The industry contributes more than DKK 24 billion to public finances, in the form of corporation taxes and personal taxes.
- In 2017, value creation in the industry increased to DKK 117 billion.

The life science industry and the COVID-19 crisis

It is not possible to see an economic effect of the COVID-19 crisis on the life science industry in this publication, as the analysis is based on company data calculated before the crisis occurred. But the Danish economy and parts of the life science industry will be affected by the COVID-19 crisis.

According to the non-governmental organisation Medicoindustrien, during the closure, the medical companies experienced a significant decline in demand for a number of products, such as knee implants and hearing aids, as the activity in the healthcare system was reorganised to improve the capacity allocated to COVID-19 patients. Other parts of the medical industry have experienced an increase in demand for their products. According to a questionnaire survey conducted by Statistics Denmark, the Danish pharmaceutical industry has not experienced a decline in turnover and does not expect to experience a negative effect from the crisis.

However, a large part of the life science industry is dependent on sales abroad, where several of the major export markets have been very affected by the crisis. A long-term negative effect can therefore not be ruled out.

On the positive side, both large and small life science companies during the crisis have shown their strong innovative power and contributed with new solutions and rapid conversion to new production.

The life science industry is creating green growth

This year's footprint analysis looks at the green footprint of the life science industry. Here it is found that the Danish life science industry is characterised by high growth rates combined with a relatively low environmental and resource footprint. According to the industry itself, the Danish life science industry began to address the environmental and climate challenges and working to reduce greenhouse gas emission in production many years ago. This is seen, among other things, by:

- Greenhouse gas emission from the life science industry have halved since 1990. At the same time, value creation has increased nearly tenfold. In this way, the life science industry accounts for a large part of the "true" Danish green growth. In other words, economic growth that is to a large extent decoupled from growth in greenhouse gas emission.

- Looking at the industry's other use of resources, there is a general decoupling between value creation and consumption, though with a few exceptions.

- From 2011 to 2017, the amount of waste that was created in relation to the value that was created in production (waste productivity) became 18 per cent less efficient, while water consumption became 26 per cent more efficient.

- The life science industry's use of energy dropped by just over 20 per cent from 2009 to 2018, in part because energy efficiency increased.

Energy consumption has fallen by **20 per cent since 2009**

Waste productivity dropped **by 18 per cent**

Greenhouse gas emission **halved** since 1990

Value added increased by 127 per cent from 2008 to 2017.

Employment has increased by 18 per cent from 2008 to 2017 and is now at 47,543 persons.

Net investment income from abroad contributes each year with slightly more than DKK 15 billion

Export has increased by 163 per cent from 2008 to 2019 and is now at DKK 142 billion.

Productivity is twice as high as in the private sector and has increased 53 per cent from 2008 to 2017.

The growth of the life science industry has increased since 1990, while C02 emissions have decreased.

The life science industry in Denmark

Who are the Danish life science companies?

The following pages show a number of key figures for companies in Danish life science.

Life science companies are defined in this report as all companies that work in parts of the value chain within medical products as well as pharmaceuticals and biotechnological preparations. In other words, companies that work with research, development, advisory services, manufacturing and/or sales. Some companies manufacture/sell products that fall within industries defined as medical as well as pharmaceuticals and biotech. Novo Nordisk is an example of this. Novo Nordisk mainly manufactures pharmaceutical preparations, but they also manufacture equipment that is used in connection with healthcare treatment. Novo Nordisk is therefore included with a main emphasis on pharmaceuticals and biotech and with a lesser emphasis on medical.

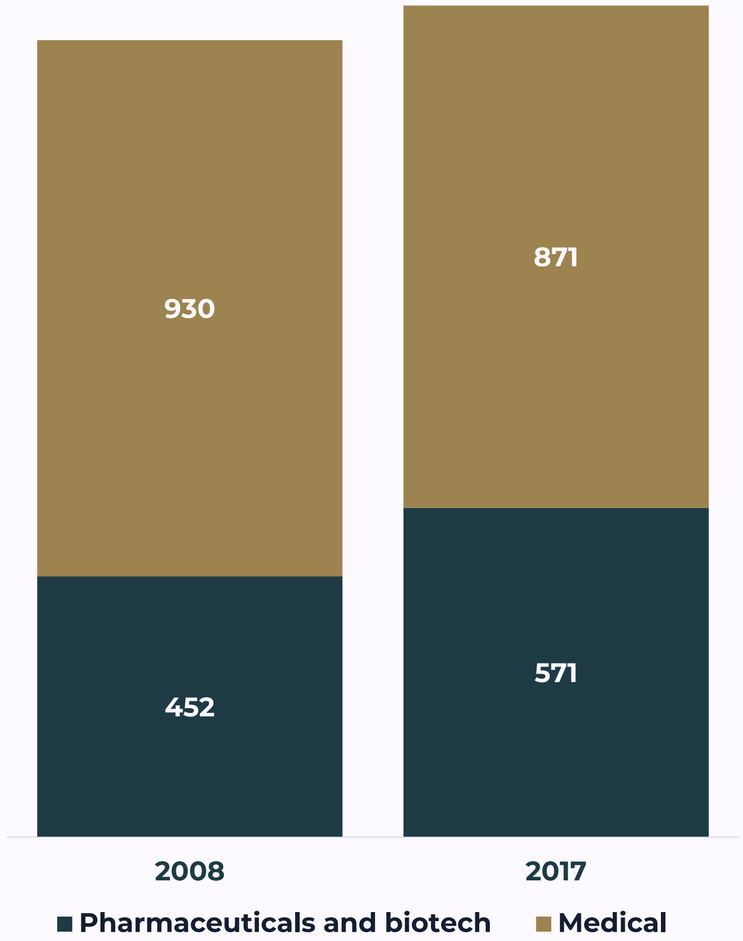
In addition, some of the life science companies operate primarily in other industries that cannot be categorised as life science. These companies are only partially included in this report with a weight corresponding to their contribution to the life science industry.

The companies

In 2017, there were a total of 1,518 companies in the life science industry in Denmark. This is an increase of 42 companies since the year before and an increase of almost 100 companies since 2008.

The growth has only taken place in pharmaceuticals and biotech, with an increase of 119 companies.

Number of companies in Danish life science, 2017



Source: Ministry of Industry, Business and Financial Affairs 2020 based on Statistics Denmark
Note: The private business sector is defined as the private business sector excluding agriculture, forestry and fishing, raw material extraction and financing and insurance.

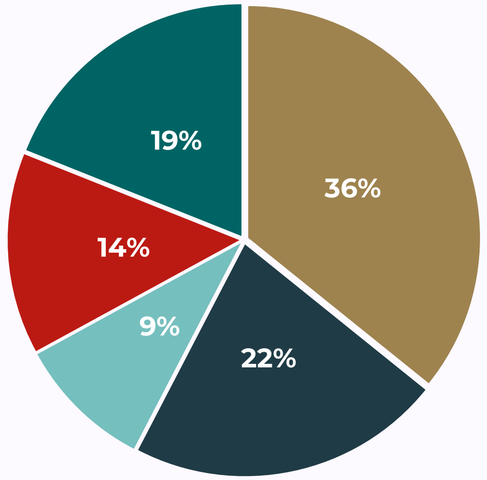
The companies

Six out of ten life science companies are located in the Capital Region. In particular, these are within the pharmaceutical and biotech industry, which has over 70 per cent of its companies in the metropolitan area.

The total life science industry thus has a greater connection to the capital than the rest of the business sector, where just over 36 per cent of the companies are located in the metropolitan area.

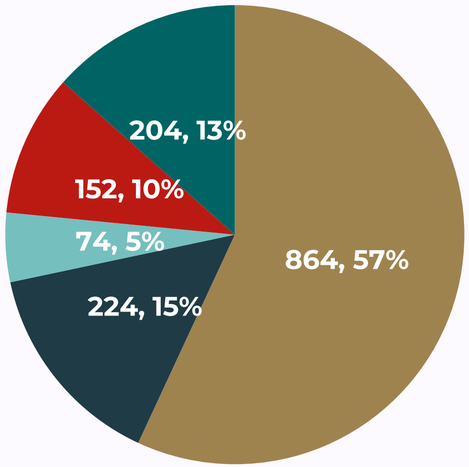
Note that the number of medical and pharmaceutical and biotech companies does not add up to the total companies since a few companies fall outside the two industry boundaries.

Regional distribution, 2017, companies in the Danish business sector, per cent



The capital
Central Jutland
North Jutland
Zealand
Southern Denmark

Regional distribution, 2017, life science, number and per cent



The capital
Central Jutland
North Jutland
Zealand

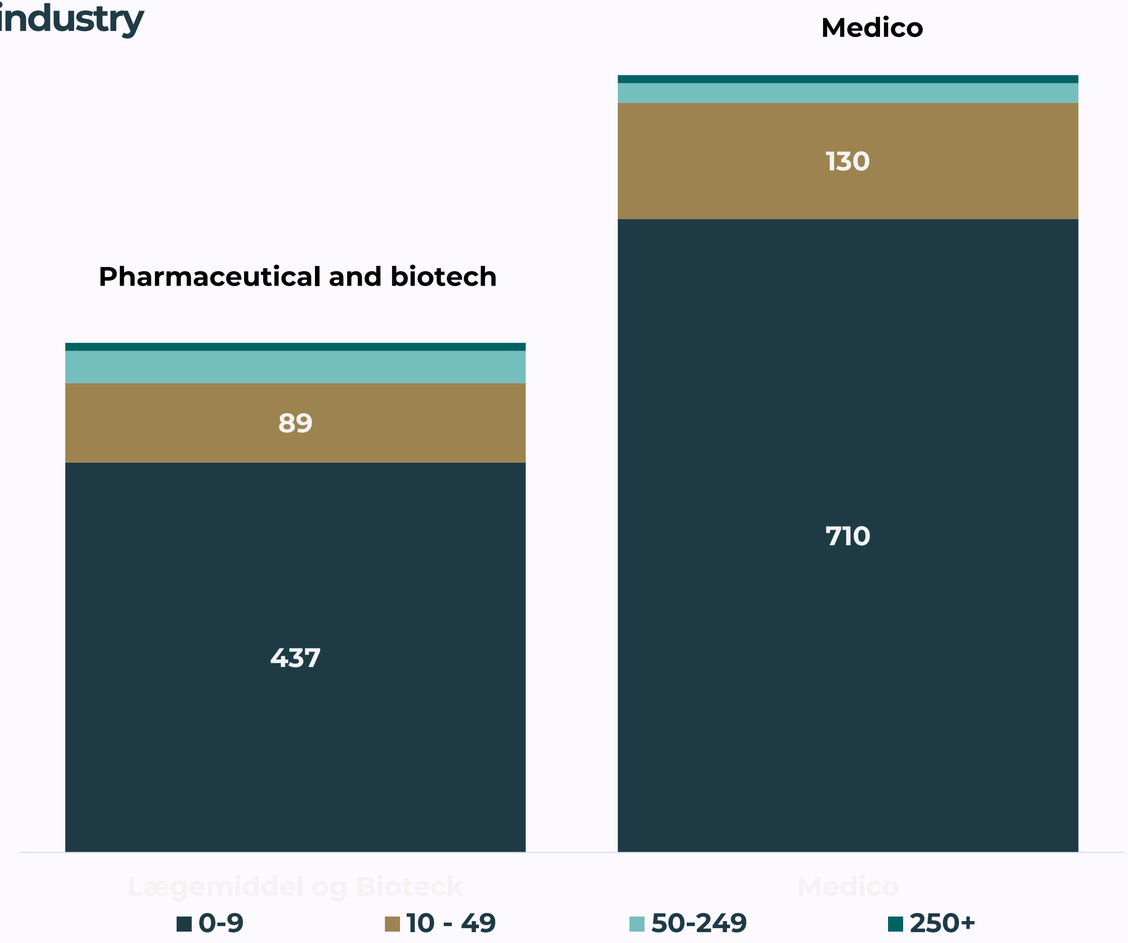
Source: Ministry of Industry, Business and Financial Affairs 2020 based on Statistics Denmark
Note: The private business sector is defined as the private business sector excluding agriculture, forestry and fishing, raw material extraction and financing and insurance.

The companies

There are more companies in the medical industry than in the pharmaceutical and biotech industry. Common to the two is that the majority of the companies are micro-companies with 9 employees or less. Both industries had 9 companies in Denmark with over 250 employees in 2017. This includes, i.a., large companies such as Novo Nordisk, Lundbeck and Coloplast.

Despite the fact that pharmaceuticals and biotech have the fewest number of companies, the industry has **31,725** employees, which constitutes 67 per cent of total employment in the life science industry.

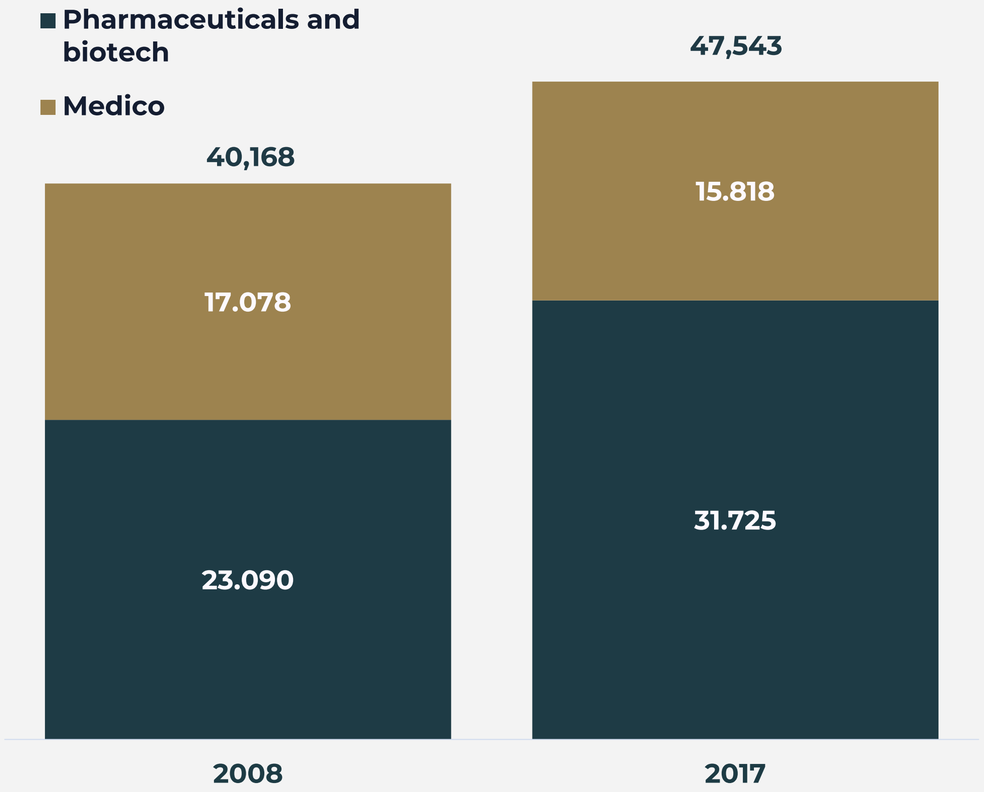
Most small companies can be found in the medical industry



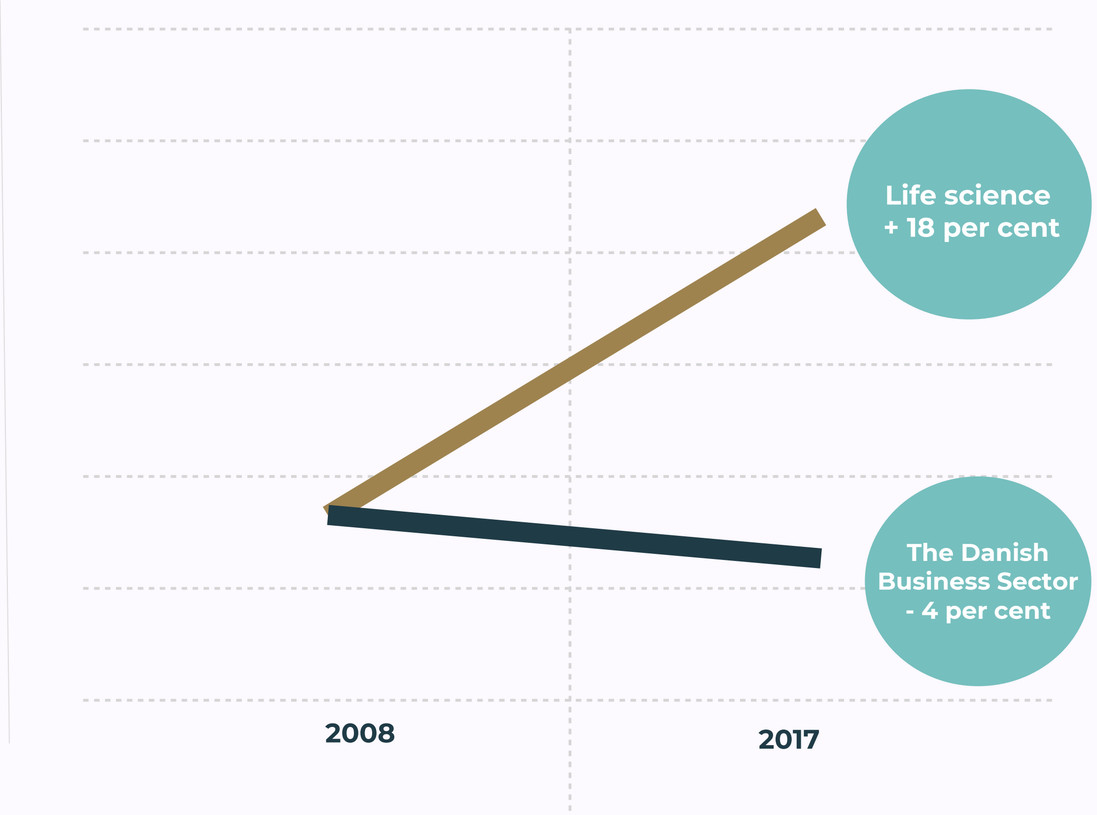
Source: Ministry of Industry, Business and Financial Affairs 2020 based on Statistics Denmark

Employment

The life science industry was responsible for 47,543 man-years in 2017. This constitutes 2.1 per cent of the Danish labour force.



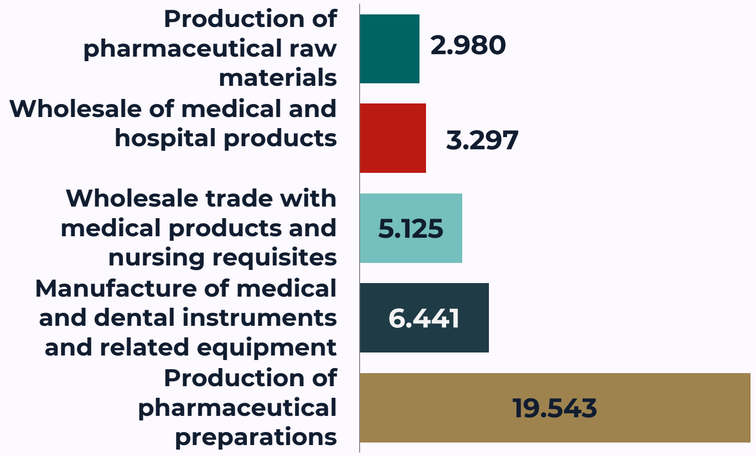
Employment in the life science industry has grown by 18 per cent from 2008 to 2017. By comparison, employment in the Danish business sector fell by 4 per cent during the period.



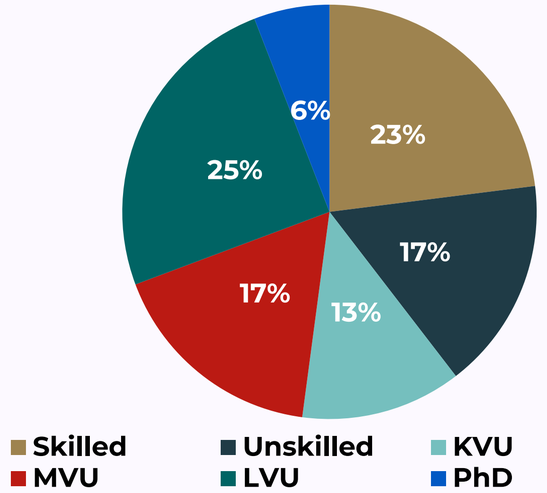
Source: Ministry of Industry, Business and Financial Affairs 2020 based on Statistics Denmark
Note: Employment is calculated based on the number of man-years, i.e. the number of full-time employees.
Note: The private business sector is defined as the private business sector excluding agriculture, forestry and fishing, raw material extraction and financing and insurance.

The persons employed in the life science industry in 2017

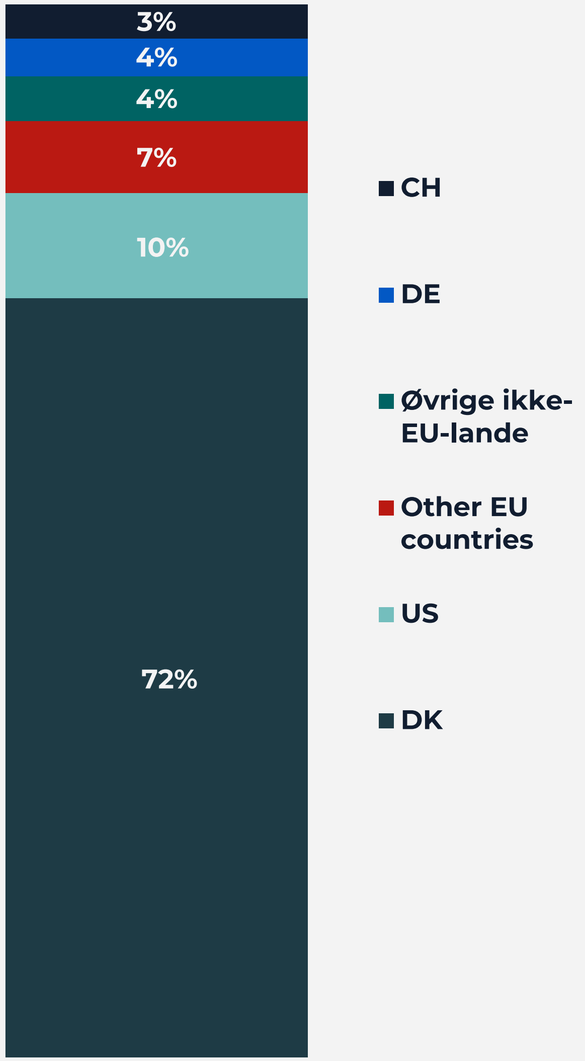
Number of full-time positions in the top five sub-sectors



More than 4 out of 10 or 22,389 are skilled or unskilled



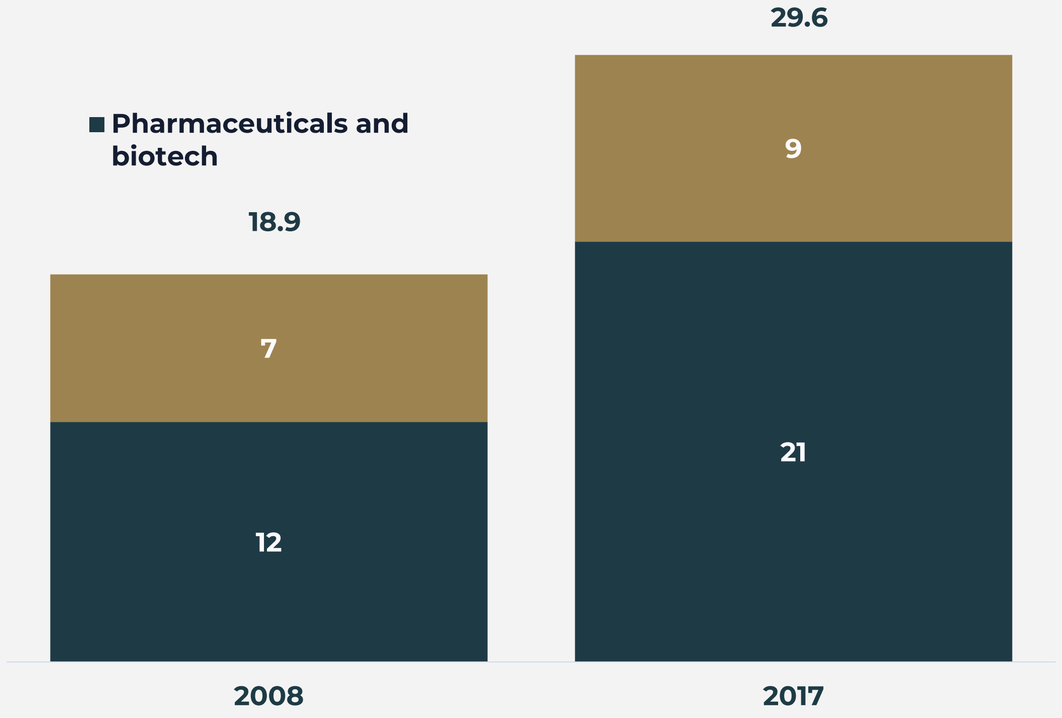
72 per cent are employed in Danish-owned companies



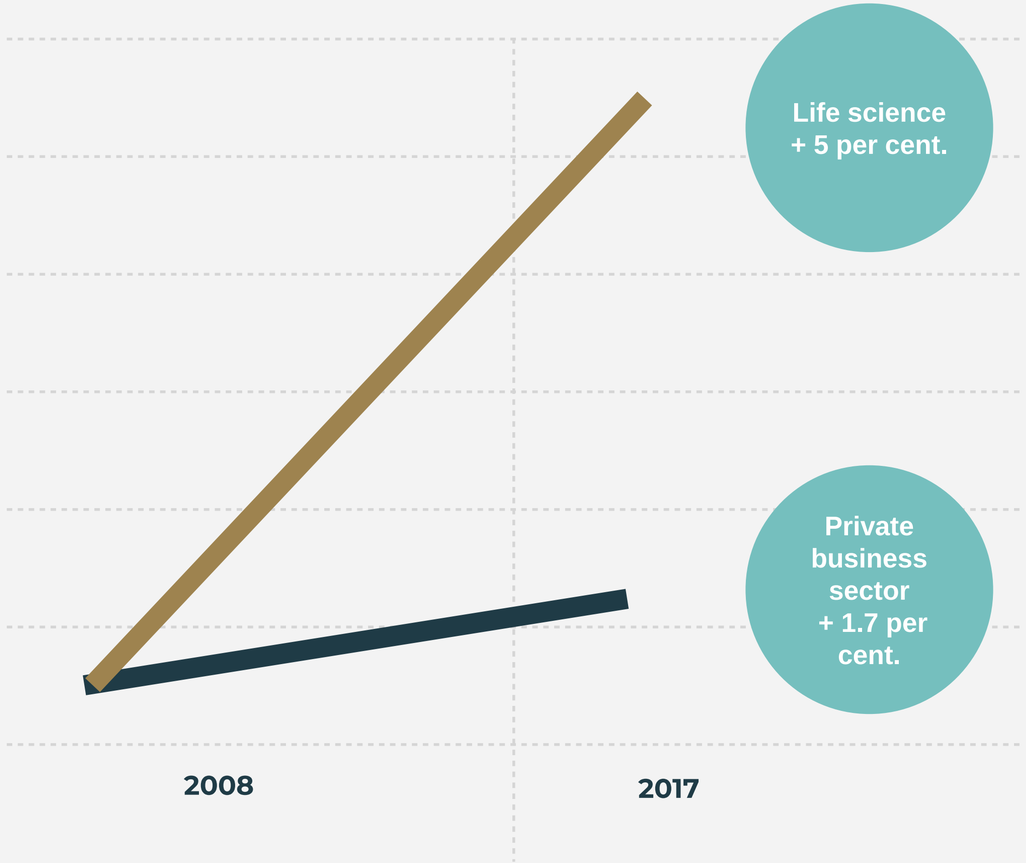
Source: Ministry of Industry, Business and Financial Affairs 2020 based on Statistics Denmark
Note: Employment is calculated based on the number of man-years, i.e. the number of full-time employees.

Salaries

In 2017, the life science industry paid salaries for just over DKK 30 billion.



The average annual wage growth in the life science industry is 5 per cent yearly.



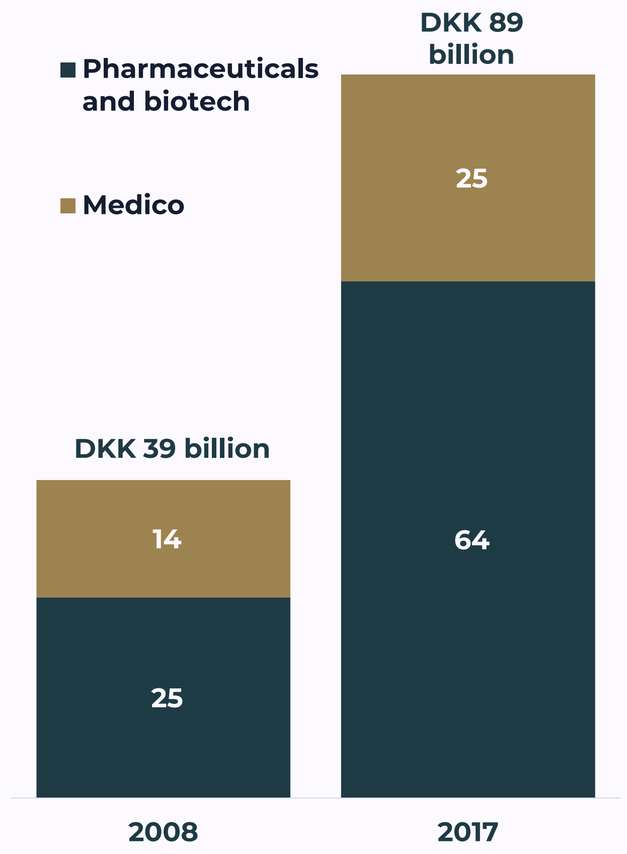
Source: Ministry of Industry, Business and Financial Affairs 2020 based on Statistics Denmark
Note: Employment is calculated based on the number of man-years, i.e. the number of full-time employees.
Note: The private business sector is defined as the private business sector excluding agriculture, forestry and fishing, raw material extraction and financing and insurance.

Value added

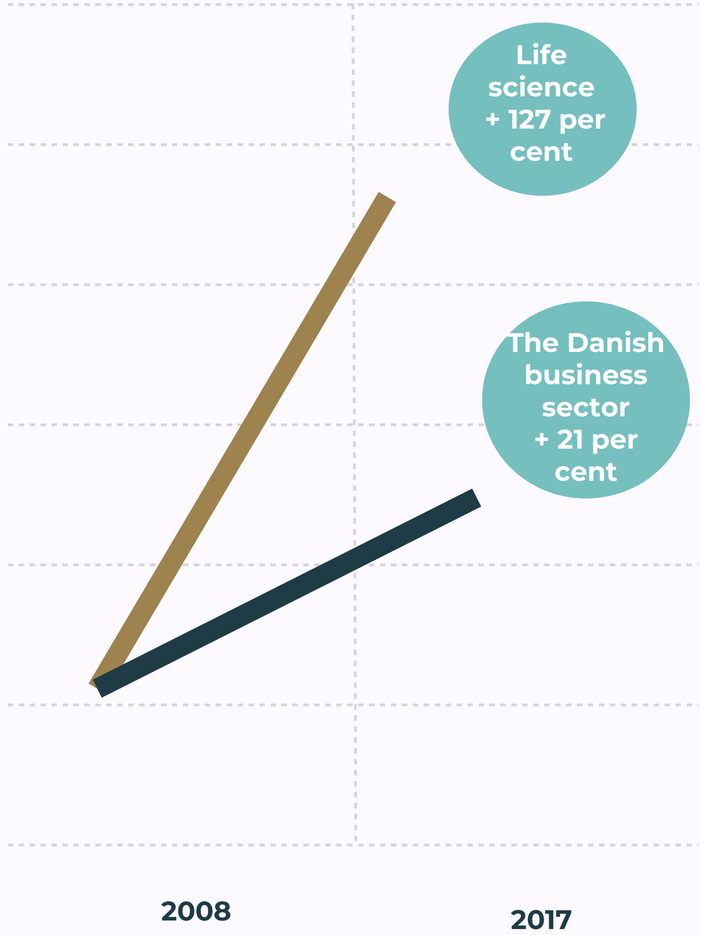
Value added is the a company's turnover less its consumption.

In 2008, the life science companies created value for DKK 39 billion. In 2017, the figure rose to almost DKK 90 billion, which means that they more than doubled value added during the period 2008-2017. The life science industry has experienced an average annual growth rate in value added of 10 per cent. The growth can mainly be attributed to the large pharmaceutical companies.

Value added in Danish life science in 2017, (excl. own R&D)



5 times the growth of the rest of the Danish business sector



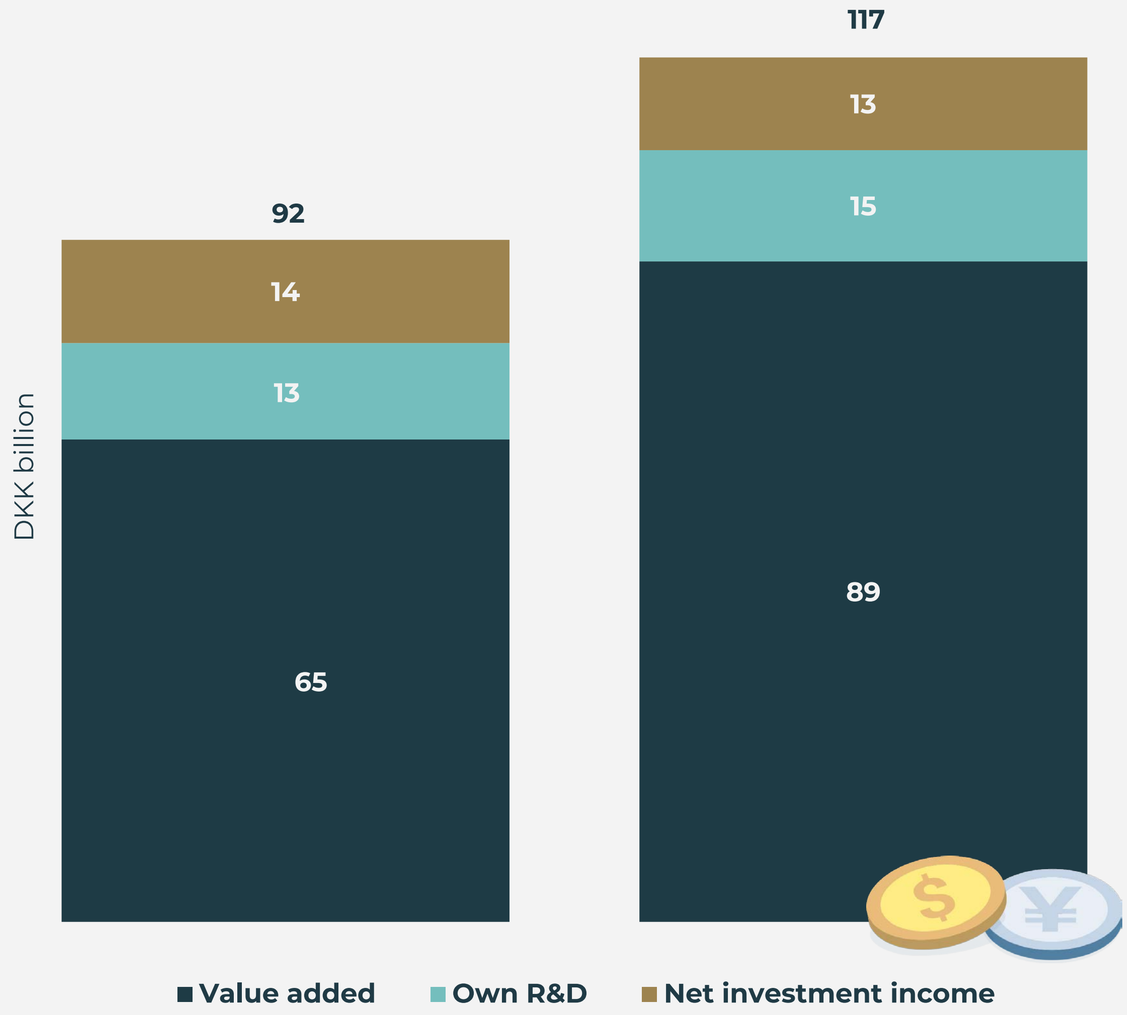
Source: Ministry of Industry, Business and Financial Affairs 2020 based on Statistics Denmark
Note:: See further explanation of the value added calculation in the section on definitions
Note: The private business sector is defined as the private business sector excluding agriculture, forestry and fishing, raw material extraction and financing and insurance

Value creation

The calculation of the total value creation in the life science industry must include the companies' investments in own research and development of DKK 14.6 billion as well as the profit created abroad constituting the net investment income of DKK 12.5 billion.

The total value creation from the life science industry was thus DKK 117 billion in 2017. This is an increase of just over DKK 25 billion since 2014, when the total value creation was DKK 92 billion.

The total value creation in Danish life science constituted DKK 117 billion in 2017.



Source: Ministry of Industry, Business and Financial Affairs 2020 based on Statistics Denmark

Turnover

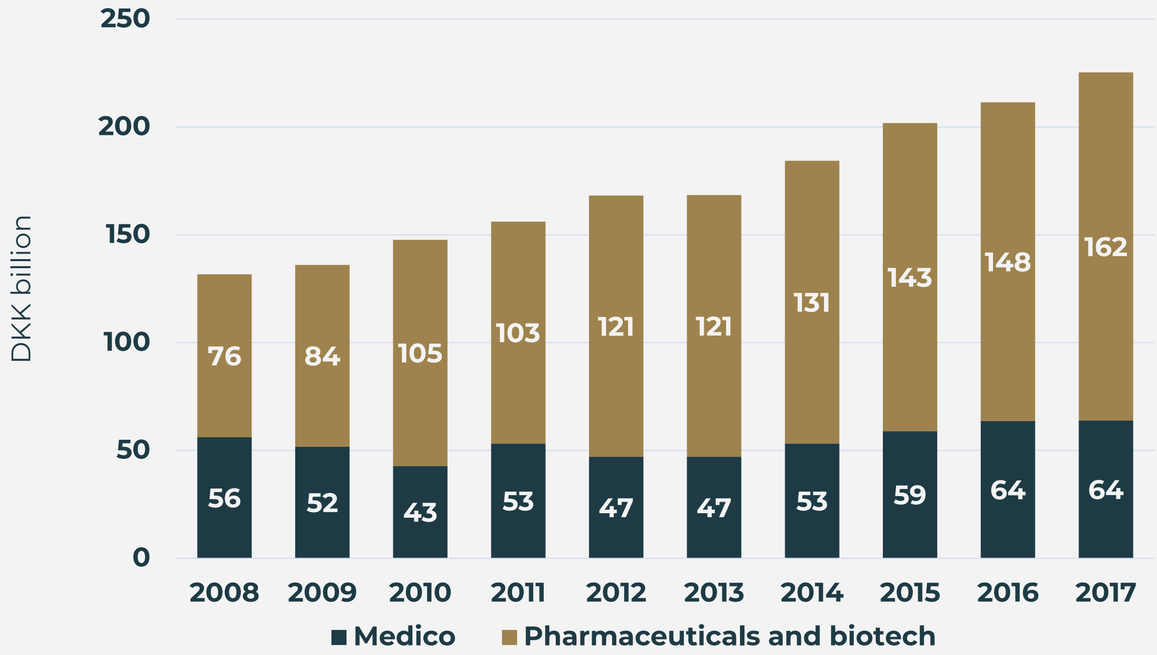
Turnover shows the industry's total income from sales of goods and services as well as return on investments.

In 2017, the life science industry had a turnover of just over DKK 225 billion, of which the pharmaceutical & biotech companies accounted for DKK 162 billion. As a result, the turnover in Danish life science now amounts to just over 6 per cent of the total turnover of the Danish economy.

In 2008, the total turnover of the life science industry was DKK 132 billion. There has thus been an average annual increase in turnover of 6 per cent between 2008-2017. By comparison, the average annual increase in the total private business sector during the same period was 2 per cent.

The high growth rates are particularly driven by the turnover within pharmaceuticals and biotech, which has more than doubled during the period.

Turnover in the life science industry in Denmark, DKK billion



Source: Ministry of Industry, Business and Financial Affairs 2020 based on Statistics Denmark
Note: The private business sector is defined as the private business sector excluding agriculture, forestry and fishing, raw material extraction and financing and insurance.

Export

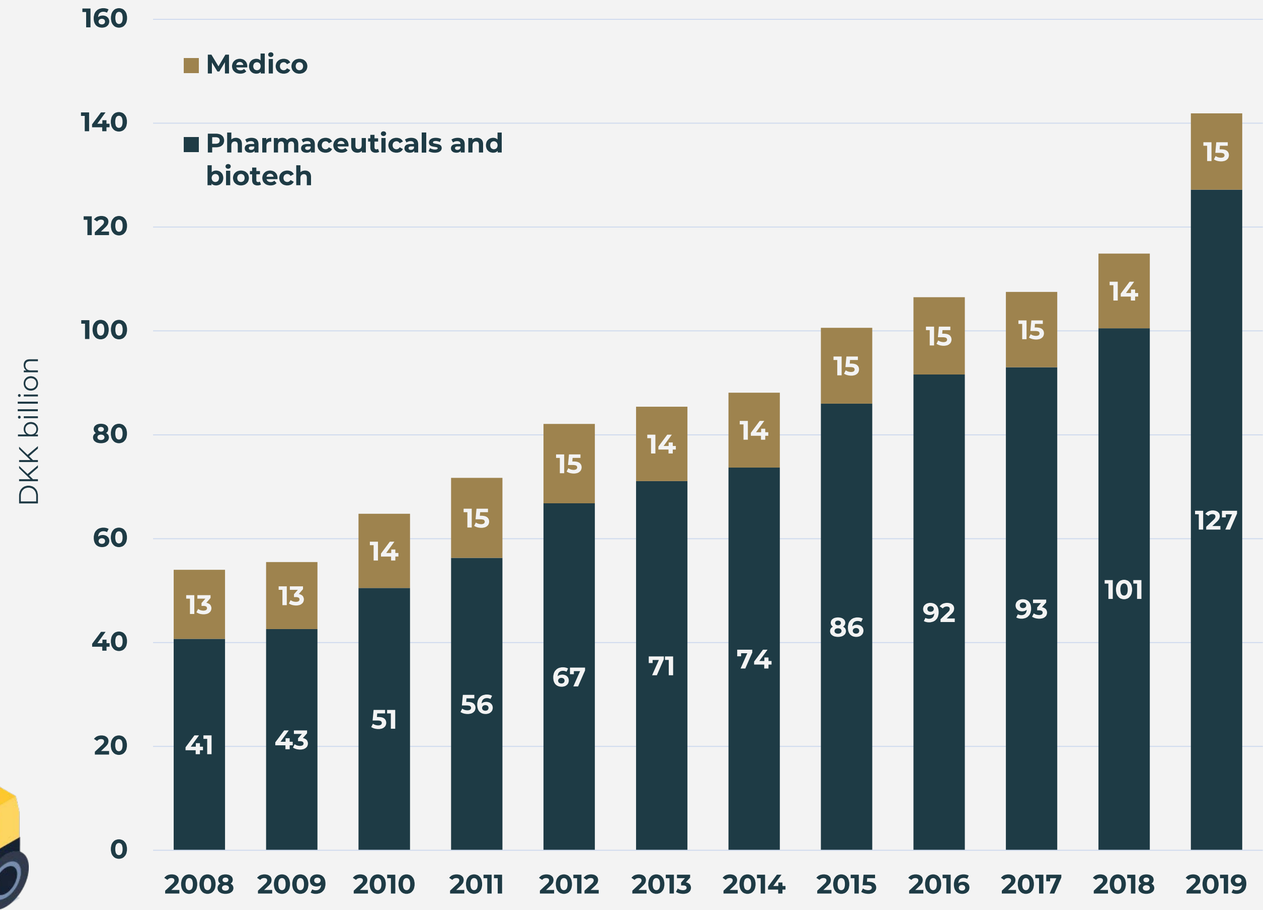
The life science industry exports abroad to a large extent, and there has been a positive development in Danish export of life science products in the period 2008-2019.

In current prices, exports have gone from to DKK 54 billion in 2008 to almost DKK 142 billion in 2019.

With an average annual growth rate of more than 9 per cent, the life science industry thus has managed to almost triple the export of goods in the period 2008-2019.

The growth in merchandise exports has mainly taken place in pharmaceuticals and biotech, where exports have increased by as much as 210 per cent during the period.

In 2019, exports of goods from the life science industry in Denmark were at DKK 142 billion.



Source: Ministry of Industry, Business and Financial Affairs 2020 based on Statistics Denmark
Note: The calculation is based on SITC product code 54 and CN product codes from Statistics Denmark

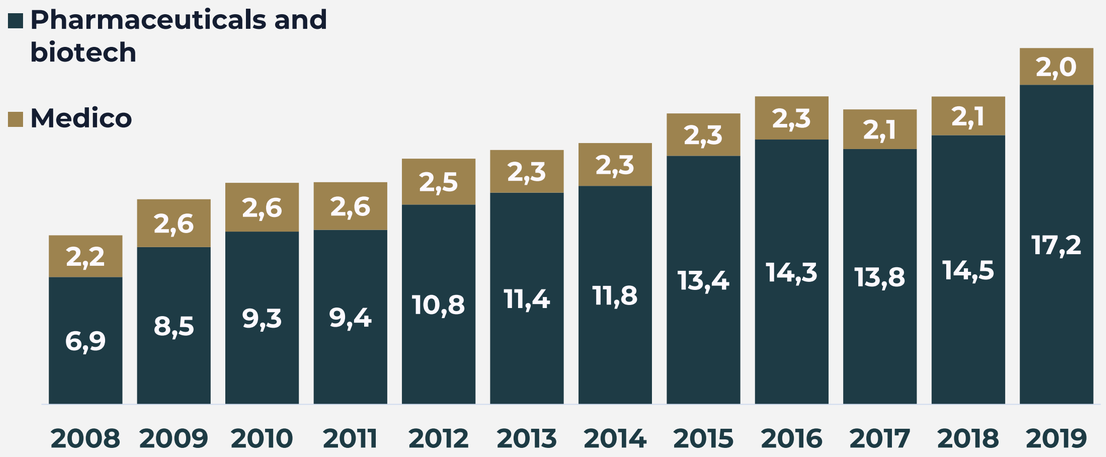
Export

The Danish life science industry's exports now account for 19 per cent of total Danish exports. This is a marked increase of 2 per cent in just one year.

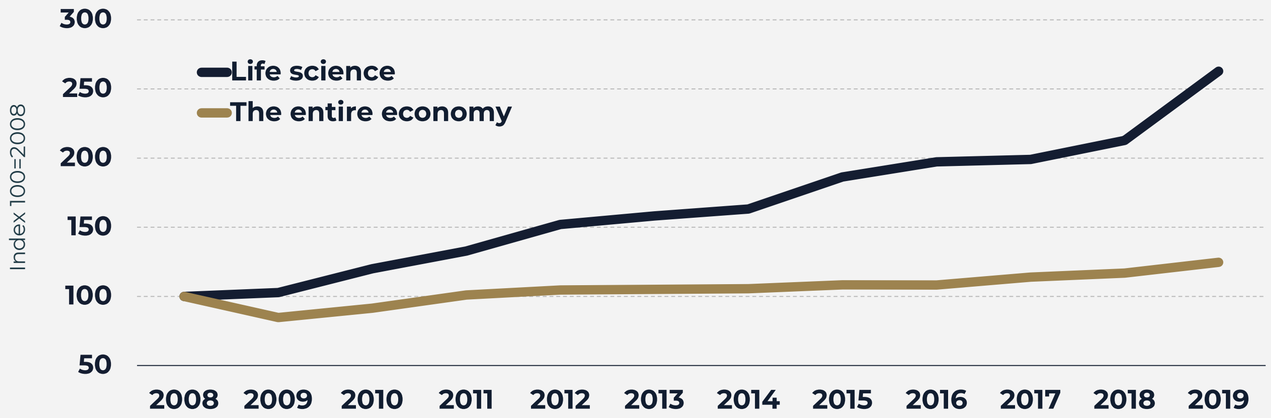
In 2008, life science exports accounted for just over 9 per cent of total Danish goods exports, while in 2019, it amounted to almost 19 per cent. This means that the figure has more than doubled.

Throughout the period, growth in Danish life science exports has been significantly higher than growth in total Danish exports. Exports from life science alone have almost tripled, while exports for the entire economy incl. the life science industry have grown by one quarter.

Life science industry exports as a share of total Danish exports, per cent



Growth in Danish exports, life science and the entire economy



Source: Ministry of Industry, Business and Financial Affairs 2020 based on Statistics Denmark
Note: The calculation is based on SITC product code 54 and CN product codes from Statistics Denmark

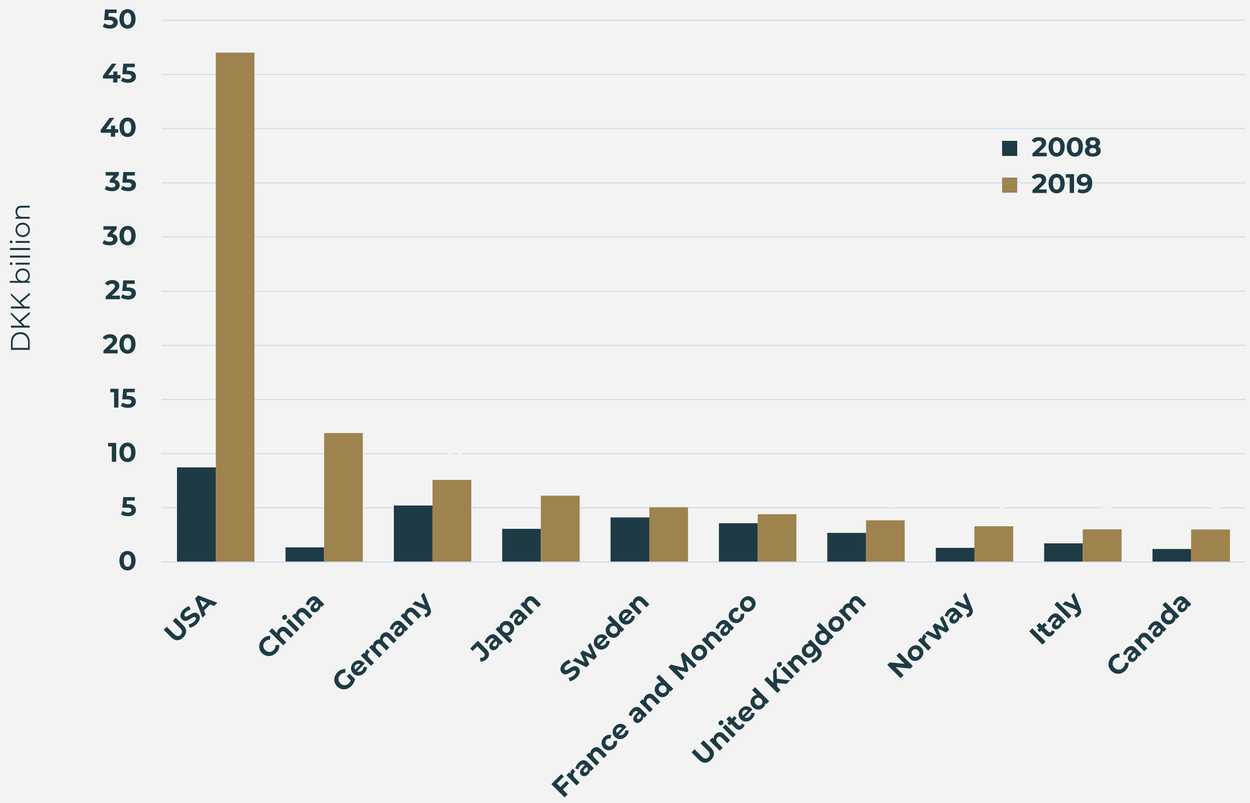
Top 10 buyers of Danish life science exports

The figure shows the top 10 buyers of Danish goods exports of life science products in 2008 and 2019.
The USA is still by far the largest buyer of Danish life science products and purchased products for DKK 47 billion in 2019 alone. This corresponds to 33 per cent of the total Danish export of life science products in 2019 and more than half of all Danish exports to the USA. This is a significant increase since 2008, but also in just one year. In 2018, life science exports to the US were just over DKK 30 billion.

Exports to China have also grown significantly in the past 10 years. During the last 10 years, with a growth of DKK 11 billion (from DKK 1 billion in 2008 to DKK 12 billion in 2019), China has grown from being a very insignificant market for Danish life science to the second largest Danish life science export market.

In 2019, the top 10 buyer countries imported life science products for a combined DKK 95 billion, corresponding to 67 per cent of the total Danish goods exports of life science products in 2019.

In 2019, the United States purchased life science goods for DKK 47 billion



Source: Ministry of Industry, Business and Financial Affairs 2020 based on Statistics Denmark
Note: The calculation is based on SITC product code 54 and CN product codes from Statistics Denmark

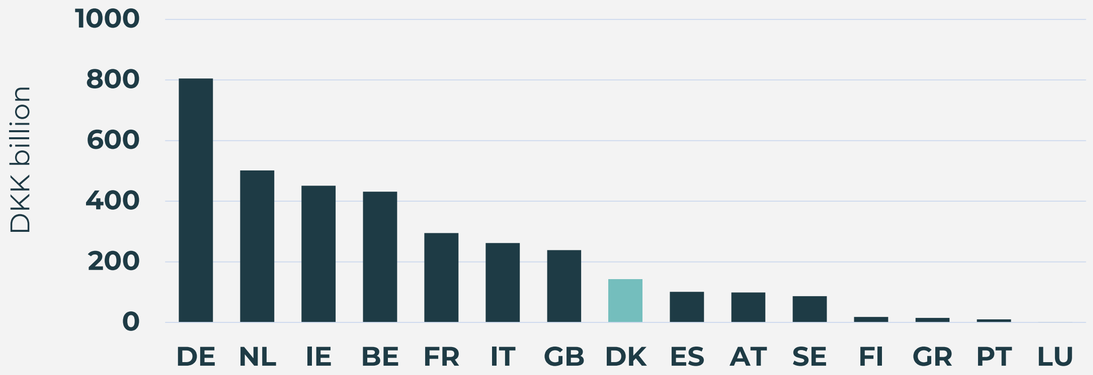
Export

Looking at the 15 countries that export the most life science products out of the country, Germany, with large companies like Boehringer Ingelheim and Merck, is in the lead with exports of just over DKK 800 billion in 2019. Denmark is the 8th largest life science nation in Europe, measured in terms of exports in absolute figures.

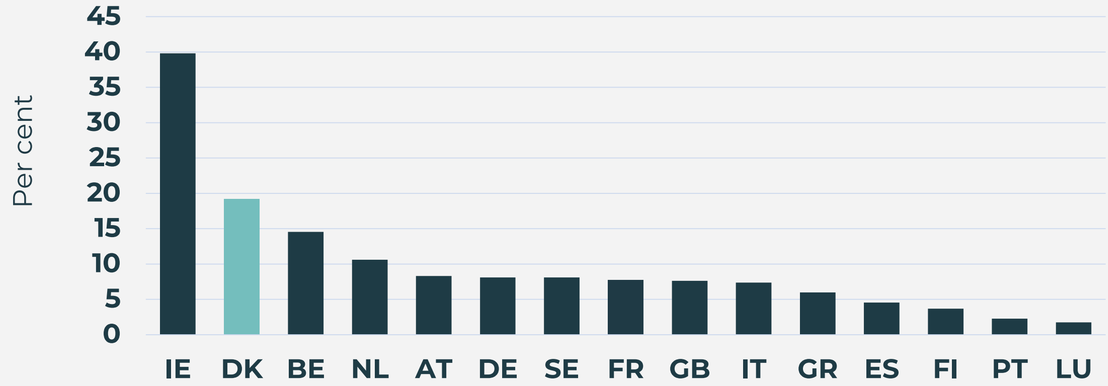
However, looking at the share of total goods exports, life science exports make up a relatively large share of total merchandise exports in Denmark compared with the other EU-15 countries.

Only in Ireland does the export of life science products account for more of the total exports of goods than in Denmark.

The EU-14 countries + GB's goods export of life science products, 2019



The life science industry's share of total goods exports, 2019



Source: Ministry of Industry, Business and Financial Affairs 2020 based on Statistics Denmark
Note: The calculation is based on SITC product code 54 and CN product codes from Statistics Denmark

Productivity

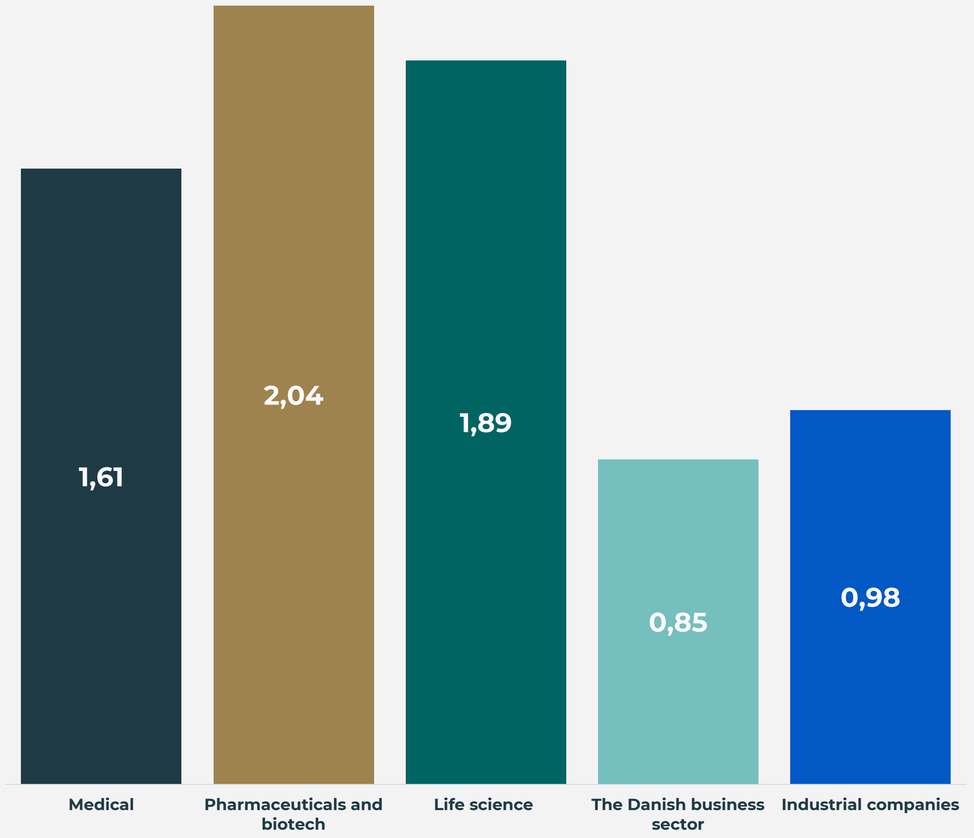
Productivity is a measure of the ability of companies or industry to create value in relation to the inputs involved in production.

Productivity can be calculated in different ways.
In this analysis, we measure value added in relation to labour input measured as the number of man-years, i.e. value added per man-years. So, when the productivity of the life science industry is DKK 1.9 million, this means that each employee in the industry creates annual value for DKK 1.9 million.

The life science industry is thus a highly productive industry with higher productivity than in the rest of the Danish business sector and the combined industrial companies, which have a productivity of DKK 0.85 and 0.98. million respectively.

Productivity in the life science industry is boosted in particular by the major pharmaceutical companies.

Productivity in the life science industry in Denmark, DKK million, 2017



Source: Ministry of Industry, Business and Financial Affairs 2020 based on Statistics Denmark
Note: The private business sector is defined as the private business sector excluding agriculture, forestry and fishing, raw material extraction and financing and insurance.

Productivity in life science has grown significantly

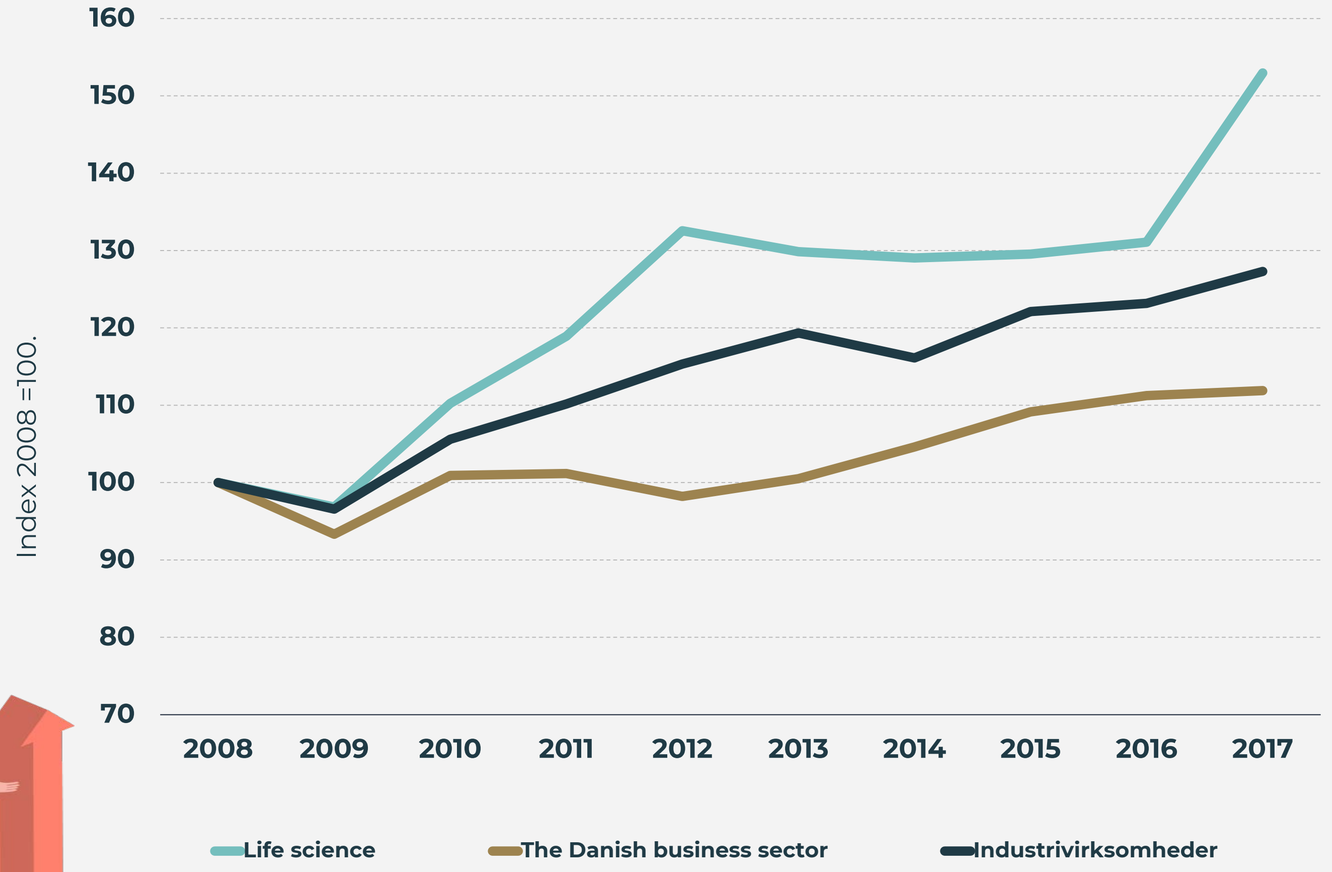
The figure shows the development in productivity at fixed prices for the life science industry, the industrial companies and the Danish business sector.

The development in fixed prices shows the real development when the general price development within the sector is disregarded.

Productivity in the life science industry has grown significantly in the period 2008-2017 compared with industrial companies and the Danish business sector in general.

Excluding price developments, productivity in the life science industry has thus grown by 53 per cent in the period from 2008-2017. In the same period, productivity in the Danish business sector has grown by 12 per cent.

Productivity development
2008-2017, fixed prices



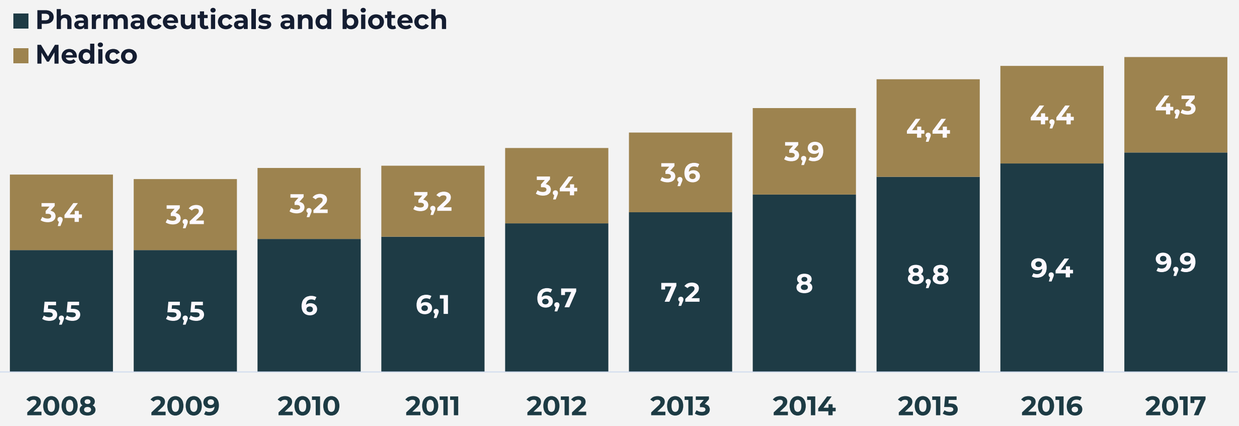
Source: Ministry of Industry, Business and Financial Affairs 2020 based on Statistics Denmark
Note: The private business sector is defined as the private business sector excluding agriculture, forestry and fishing, raw material extraction and financing and insurance. The fixed prices are calculated on the basis of the price index for value added in the pharmaceutical industry and the general Danish business sector. The price index is then weighted by the pharmaceutical industry's share of the total value added within life science, the business sector and industry, respectively.

Tax payments

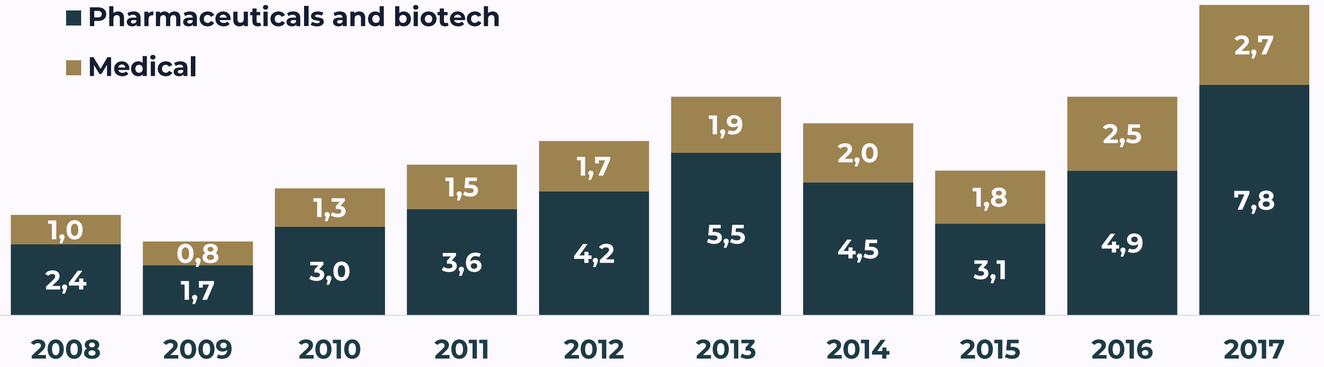
The life science industry contributed DKK 24.7 billion in 2017 to public finances, in the form of corporation taxes and personal taxes. Of the DKK 24.7 billion, DKK 14.2 billion stem from the personal taxes of employees in the life science companies, i.e. income tax and labour market contributions.
The remaining 10.5 billion come from the life science companies' corporation tax payments.

The tax revenue from companies and employees in the life science industry has doubled since 2008.

Personal tax in the life science industry (DKK billion)



Corporation tax in the life science industry (DKK billion)



Source: Ministry of Industry, Business and Financial Affairs 2020 based on Statistics Denmark
Note: Personal tax is defined as state tax (bottom-bracket tax and top-bracket tax), municipal tax, health contribution and labour market contribution, i.e. income tax plus labour market contribution.
* Private business sector excluding agriculture, raw material extraction and the financial sector.

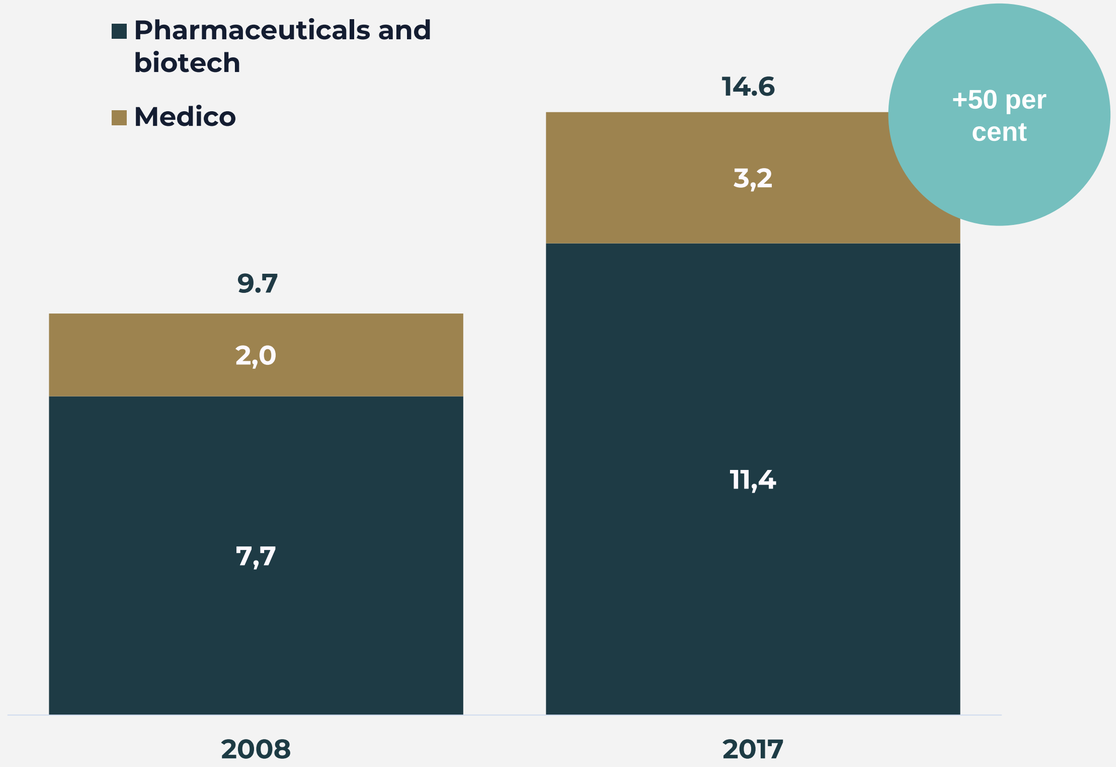
Own research and development

Research and development contribute to promoting growth and thus also to strengthening Danish competitiveness. In 2017, the innovative companies * in the life science industry invested almost DKK 15 billion in their own research and development (R&D). As a result, investments in R&D have increased by 50 per cent since 2008.

In 2017, the innovative life science companies accounted for 34 per cent of the country's total investments in own R&D of around DKK 43 billion.

The life science industry is characterised by spending a large part of its turnover on research and development. In 2017, the life science industry spent just over 6 per cent of turnover on its own research and development. In the same year, companies in the Danish economy spent just over 1 per cent of turnover on research and development.

Life science industry investments in own research and development in 2017, DKK billion



Source: Ministry of Industry, Business and Financial Affairs 2020 based on Statistics Denmark
Note: The private business sector is defined as the private business sector excluding agriculture, forestry and fishing, raw material extraction and financing and insurance
Note: * Innovative companies include the companies that are included in Statistics Denmark's annual research and development survey. The definition of research and development work (R&D) covers work carried out on a systematic basis to increase existing knowledge and the utilisation of this knowledge to devise new areas of application.

Purchased own research and development

In addition to the research and development work carried out internally in the life science companies, another important source of new knowledge in the business world is the R&D services that the companies carry out externally. This is called 'purchased R&D'.

In 2017, the life science industry incurred expenditure for purchased R&D totalling DKK 12 billion. This is more than half of the expenditure on purchased R&D in the entire economy, which amounts to DKK 20 billion.

It should be noted that the figure for own R&D cannot be added together with purchased R&D, as there is an overlap between the two figures. This is because R&D activities purchased from a subsidiary statistically count as both own R&D and purchased R&D.

Purchased R&D in the life science industry in Denmark

Source: Ministry of Industry, Business and Financial Affairs 2020 based on Statistics Denmark

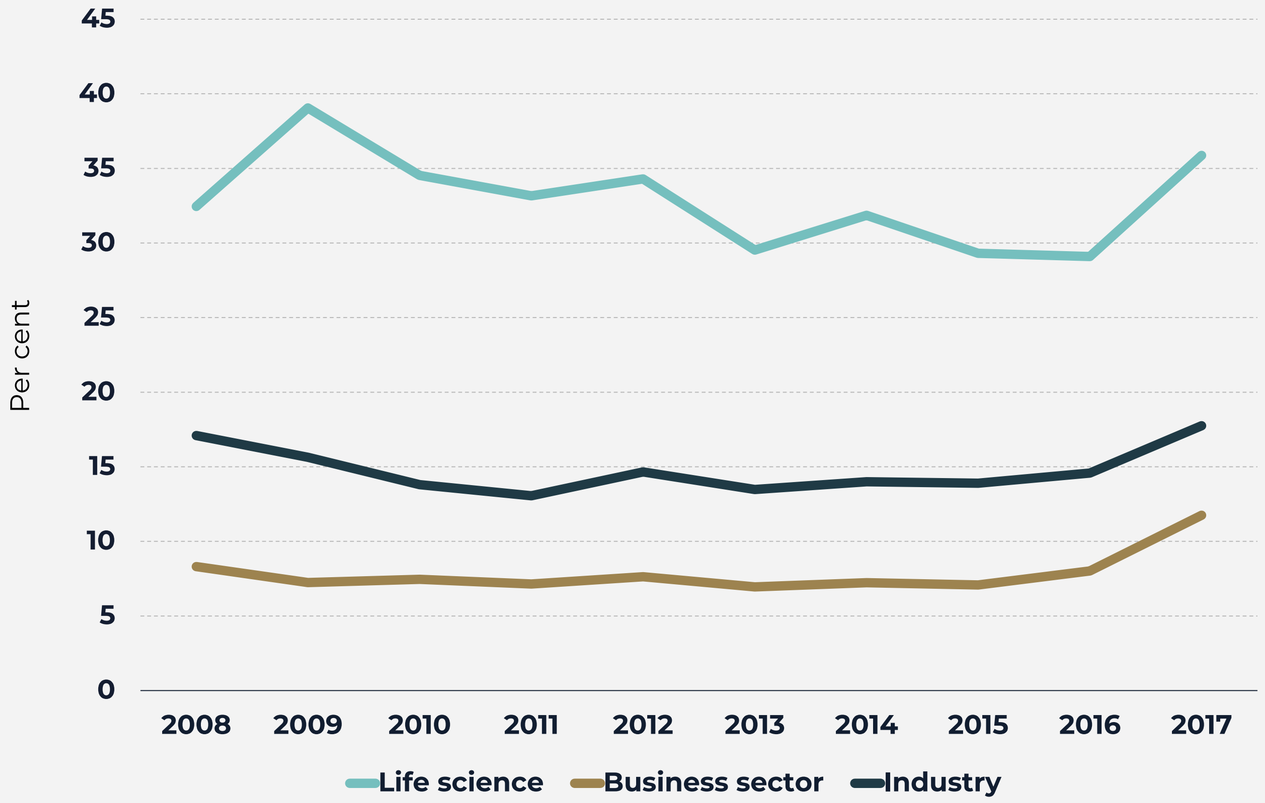
Patents

Life science companies are research-heavy and spend a lot of money on R&D every year. Therefore, the companies want to secure their investment by taking out patents.
About 36 per cent of the innovative companies in the life science industry applied for patents in 2017. This is a small increase of 4 per cent since 2008.

By comparison, 12 per cent of the innovative companies in the Danish business sector applied for patents in 2017 and 18 per cent of the industrial companies. This shows a general positive development for the entire economy.

From 2009 to 2018, the number of patents issued to Danish companies globally increased from 2,497 to 4,697.

Share of the innovative companies in life science, the Danish business sector and industry which have applied for patents 2008-2017



Source: Ministry of Industry, Business and Financial Affairs 2020 based on Statistics Denmark and https://www3.wipo.int/ipstats/index.htm?tab=patent
Note: The private business sector is defined as the private business sector excluding agriculture, forestry and fishing, raw material extraction and financing and insurance.

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Property income and foreign investment

Property income and foreign investment

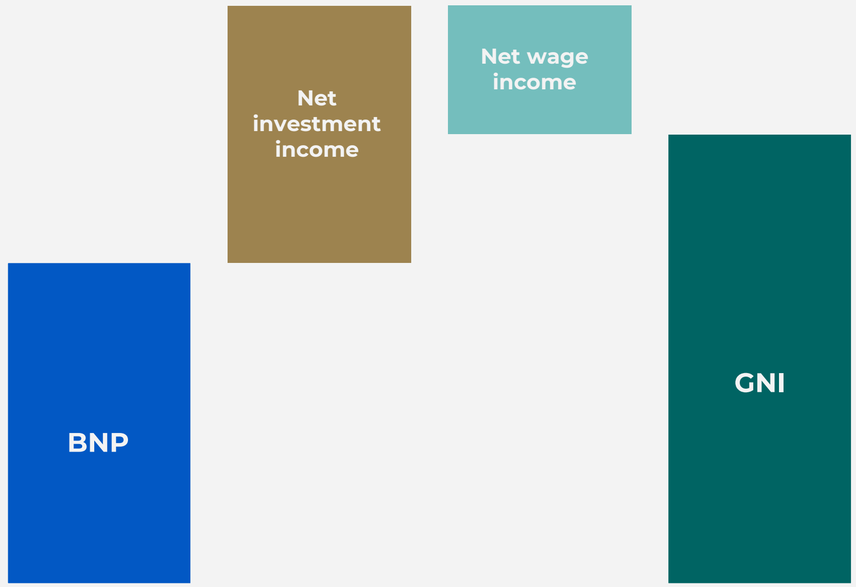
The Danish life science industry not only creates value through the production that takes place in Denmark. When Danish life science companies produce through subsidiaries abroad or receive return on investment outside the country's borders, they can subsequently move the money back to Denmark, benefitting Danish prosperity and investments in Denmark. Data on investment income and foreign investments come from a special extract from Danmarks Nationalbank.

Investment income thus consists of the income that Danish companies bring home from investments abroad, less the income that foreign companies withdraw from Denmark.

Foreign investment consists of foreign investments in Danish life science and the life science industry's investments abroad, e.g. in the form of the establishment of subsidiaries, major investments, etc. Danish life science companies invest abroad with the expectation of generating a return. The investments abroad therefore create a basis for future investment income, which can contribute to Danish prosperity and future investments in Denmark.

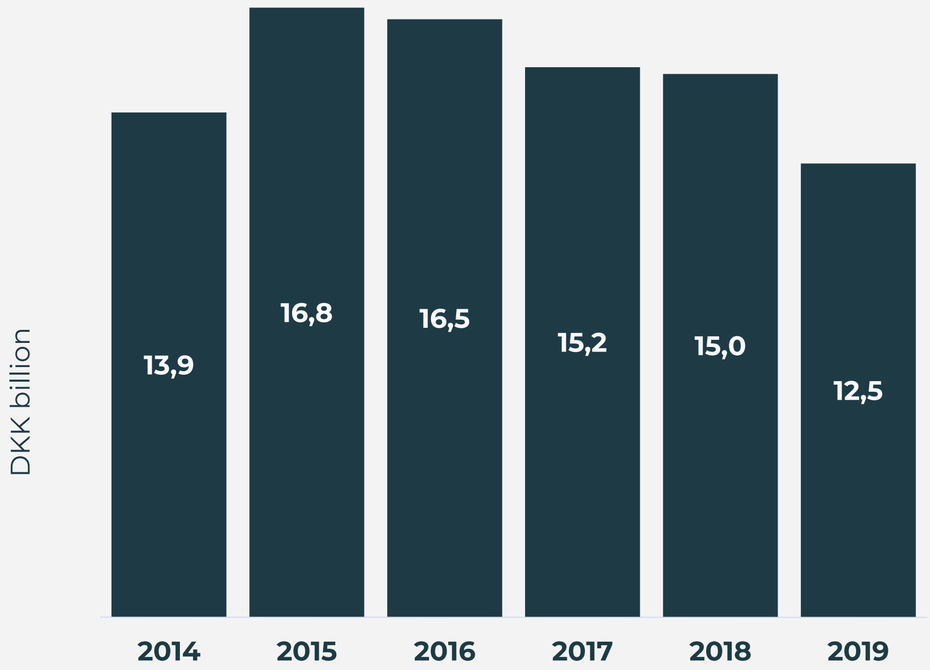
Net wages refers to the wages paid to Danish employees abroad, less wages for foreign employees in Denmark.

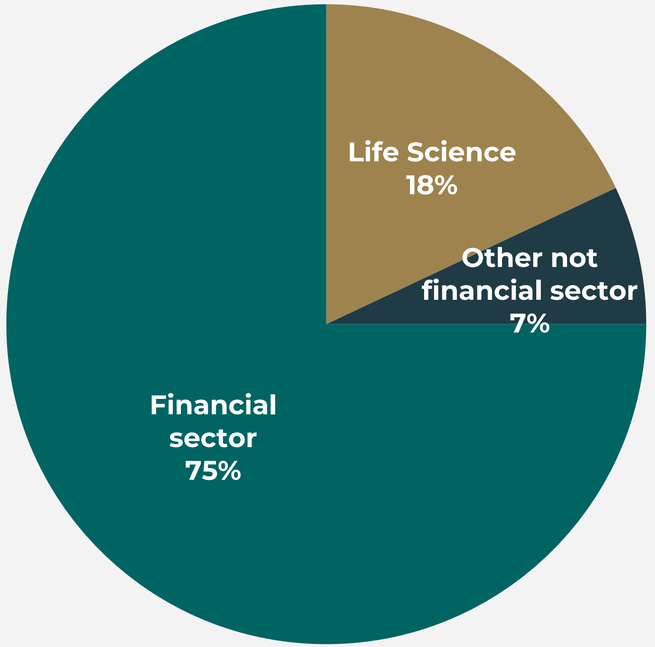
Net investment income plus net wages make up the difference between GNI and GDP



Net investment income

In 2019, the life science industry's net investment income from abroad was DKK 12.5 billion.





In 2019, the life science industry was responsible for 18 per cent of the Danish net investment income

Source: Ministry of Industry, Business and Financial Affairs 2020 based on Special extract from Danmarks Nationalbank
Note: The figure for net investment income cannot be compared with previous announcements due to audits
Note: Overall, Denmark's relatively high investment income can be attributed to the fact that Denmark's investment assets abroad contain more risk than our liabilities. Therefore, in most years, the assets provide a greater return than the liabilities. (source: Danmarks Nationalbank, Quarterly overview, 4th quarter 2011)

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Investment income

Over the past six years, the Danish life science industry has generated an investment income from abroad averaging DKK 16.4 billion per year.

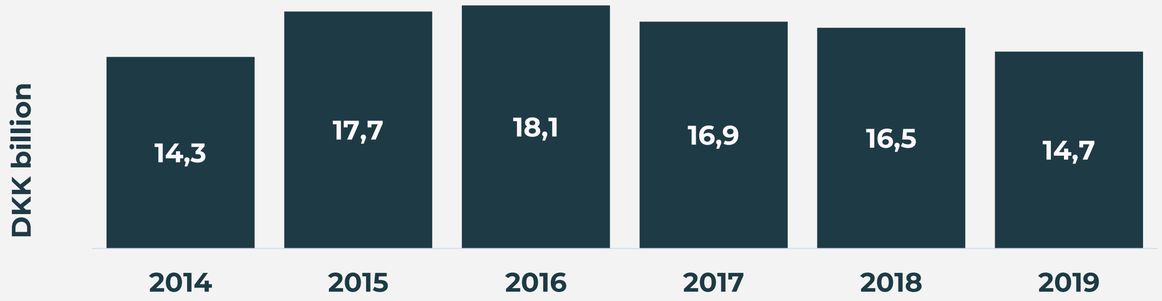
This exceeds the amount that foreign life science companies have withdrawn from Denmark. Therefore, net investment income has contributed positively to GNI.

However, investment income from abroad has dropped from around DKK 17 billion during the last three years to DKK 14.7 billion in 2019. The decline in foreign profit may be due to production activity or sales being relocated to Denmark.

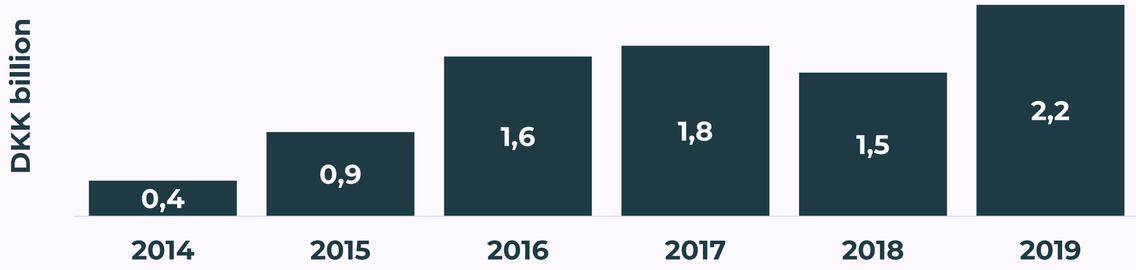
Foreign companies have withdrawn an average of just over DKK 1.4 billion annually from Danish life science since 2014.

Source: Ministry of Industry, Business and Financial Affairs 2020 based on Special extract from Danmarks Nationalbank

Investment income from abroad in Danish life science (DKK billion)



Investment income from abroad from life science in Denmark (DKK billion)



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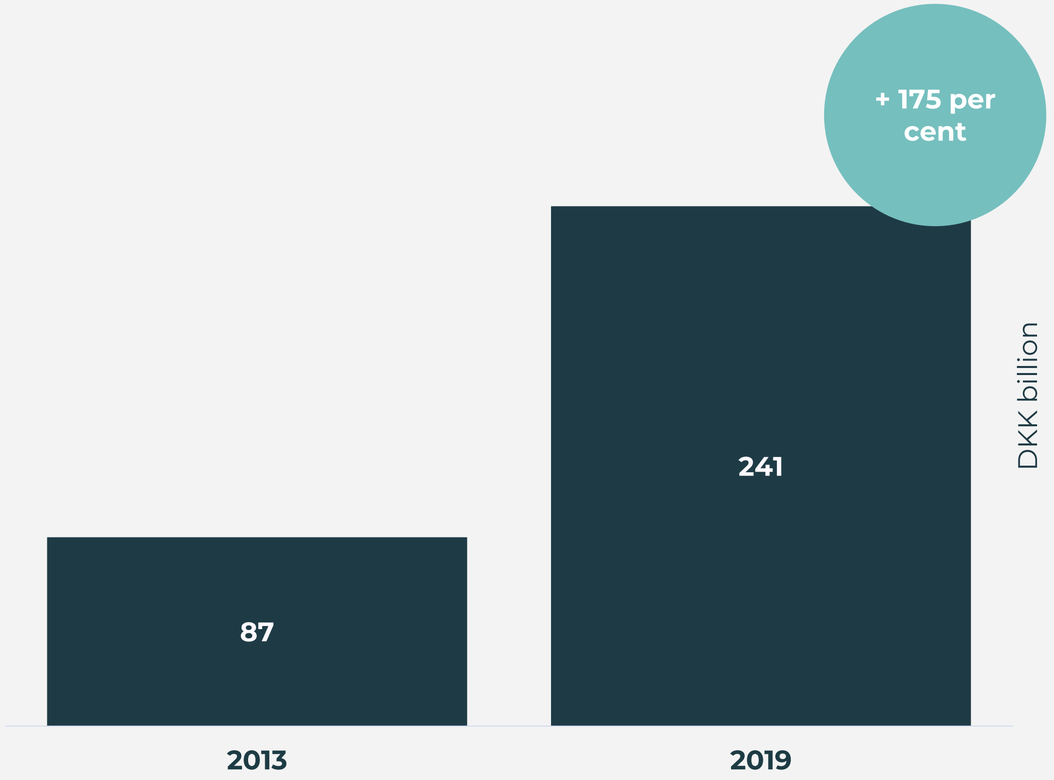
Life science investments abroad

The Danish life science industry owns assets abroad for DKK 241 billion consisting of direct investments, i.e. in subsidiaries, investments, etc.

It is not possible to obtain data for investments abroad for the entire economy for 2019. However, in 2018, investments abroad for the entire Danish industry amounted to DKK 284 billion, and therefore, investments in life science amounted to 75 per cent of industry investment abroad.

Investments abroad have more than doubled in the period 2013-2019, where they have increased by 175 per cent. This has triggered gains for life science companies consisting of investment income of over DKK 100 billion during the period.

Life science industry investments abroad (DKK billion)



Source: Ministry of Industry, Business and Financial Affairs 2020 based on special extracts from Danmarks Nationalbank and own calculations
Note: The figures are calculated as the portfolio of investments at the end of the year.

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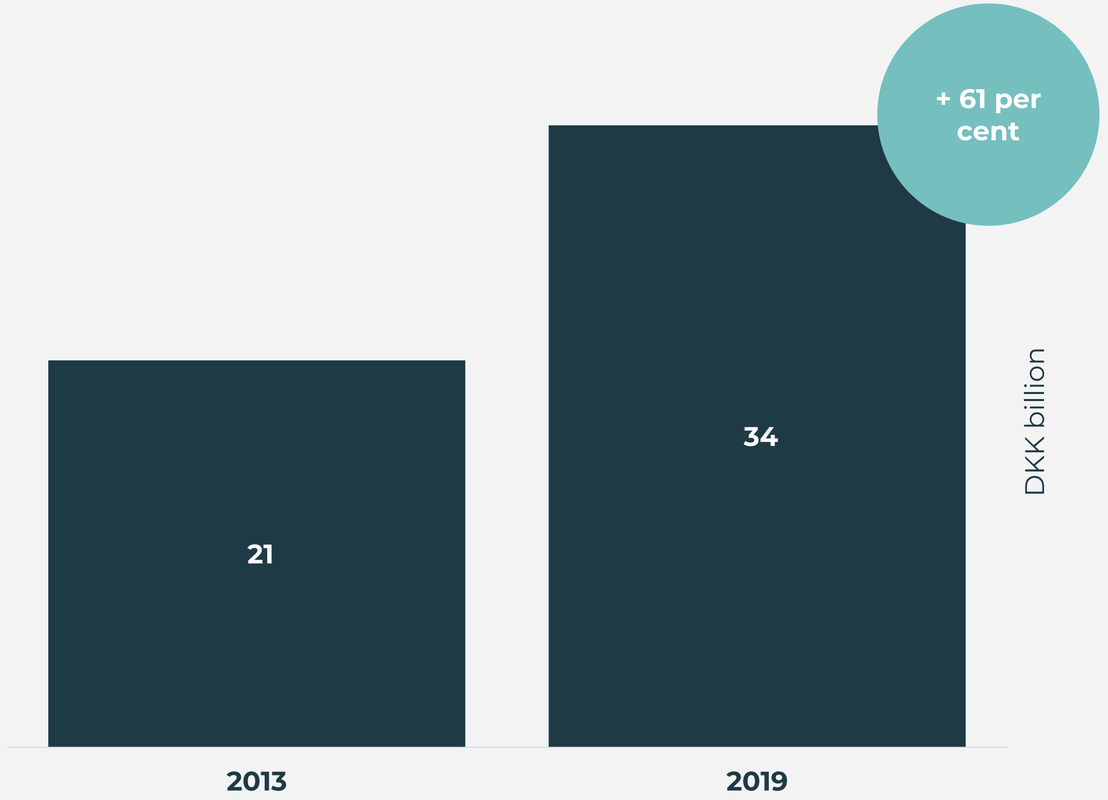
Investment from abroad in Danish life science

In 2019, foreign investment in Danish life science was just over DKK 34 billion. Foreign investment in Danish life science has been steadily increasing over the past five years. And has increased by 61 per cent since 2013.

In 2018, the total investments in Danish industry were DKK 80.6 billion. As a result, investments in life science accounted for almost half of the foreign investment in Danish industry in 2018.

Investments from abroad in Danish life science (DKK billion)



Source: Ministry of Industry, Business and Financial Affairs 2020 based on special extracts from Danmarks Nationalbank and own calculations
Note: The figures are calculated as the portfolio of investments at the end of the year.

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International comparisons

International comparisons

Data from Eurostat covers 96 per cent of the overall picture

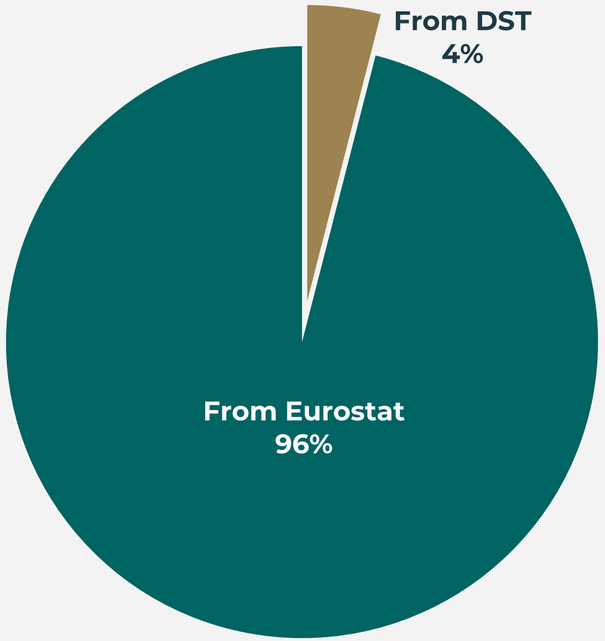
The following pages provide international comparisons of a number of economic indicators for the life sciences industry, including employment, turnover, value added and productivity.

For this comparison, macro data from Eurostat are used. This means that it is not possible to see the key figures at as detailed a level as is the case when using data from Statistics Denmark, which were presented in the first section. More specifically, it is not possible to differentiate between medical and pharmaceuticals and biotech.

With figures from Eurostat, it is possible to compare 96 per cent of the Danish life science employment internationally - i.e. that the Danish key figures are slightly underestimated in this comparison.

Eurostat does not have data for all key figures in all countries, so the same countries do not recur in all the comparison figures below. However, some of the missing information has been handled by simple interpolation.

The total for each country consists exclusively of the companies in the industries B-N excluding K, i.e. private business without agriculture and the financial sector. This is because Eurostat does not compile statistics for all industries. This applies to all the following figures in the international comparison.



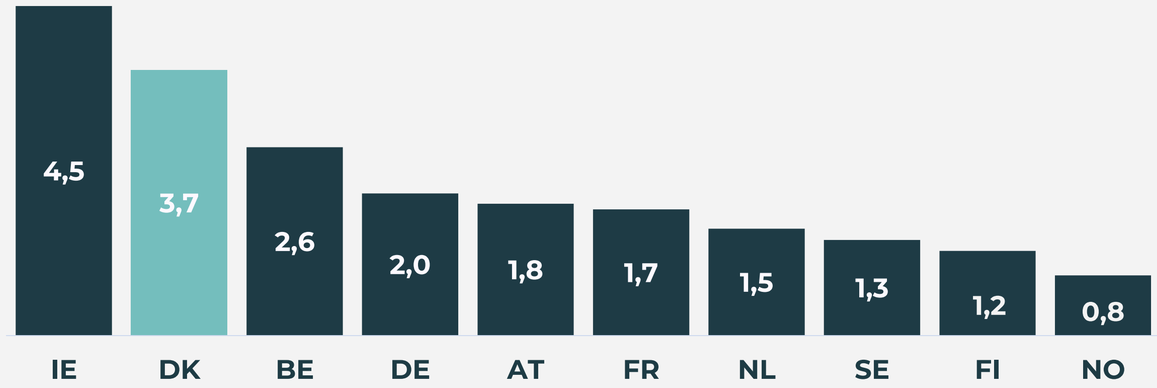
Employment in the life science industry in Europe

In 2017, the number of employees in the life science industry was 3.7 per cent of the total employment in Denmark when calculated by Eurostat. Denmark employs a relatively large share in life sciences compared with neighbouring countries.

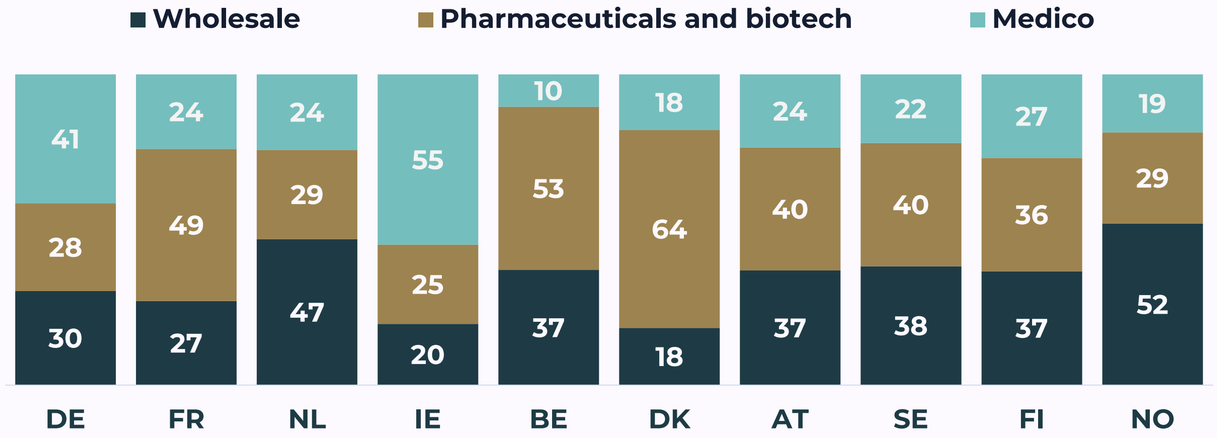
Only Ireland has a higher employment rate than Denmark. Ireland employs a particularly large proportion in the medical industry compared to the other countries, including many in the manufacture of medical and dental instruments associated equipment. Denmark is the country that employs the largest share in pharmaceuticals and biotech.

Source: Ministry of Industry, Business and Financial Affairs 2020 based on Eurostat
Note: Employment is calculated in the number of man-years. Eurostat has not calculated the number of man-years for EU28, which is why it has not been included. There are few observations for the UK, which is why it is also not included. The pharmaceutical and biotech employment for Ireland is also higher than indicated in the figure above, as the employment figures for the research and experimental development in biotechnology industry are not indicated for Ireland by Eurostat.

Employment in the life science industry in selected European countries, 2017 (per cent)



Distribution of employees across sectors, 2017 (per cent)



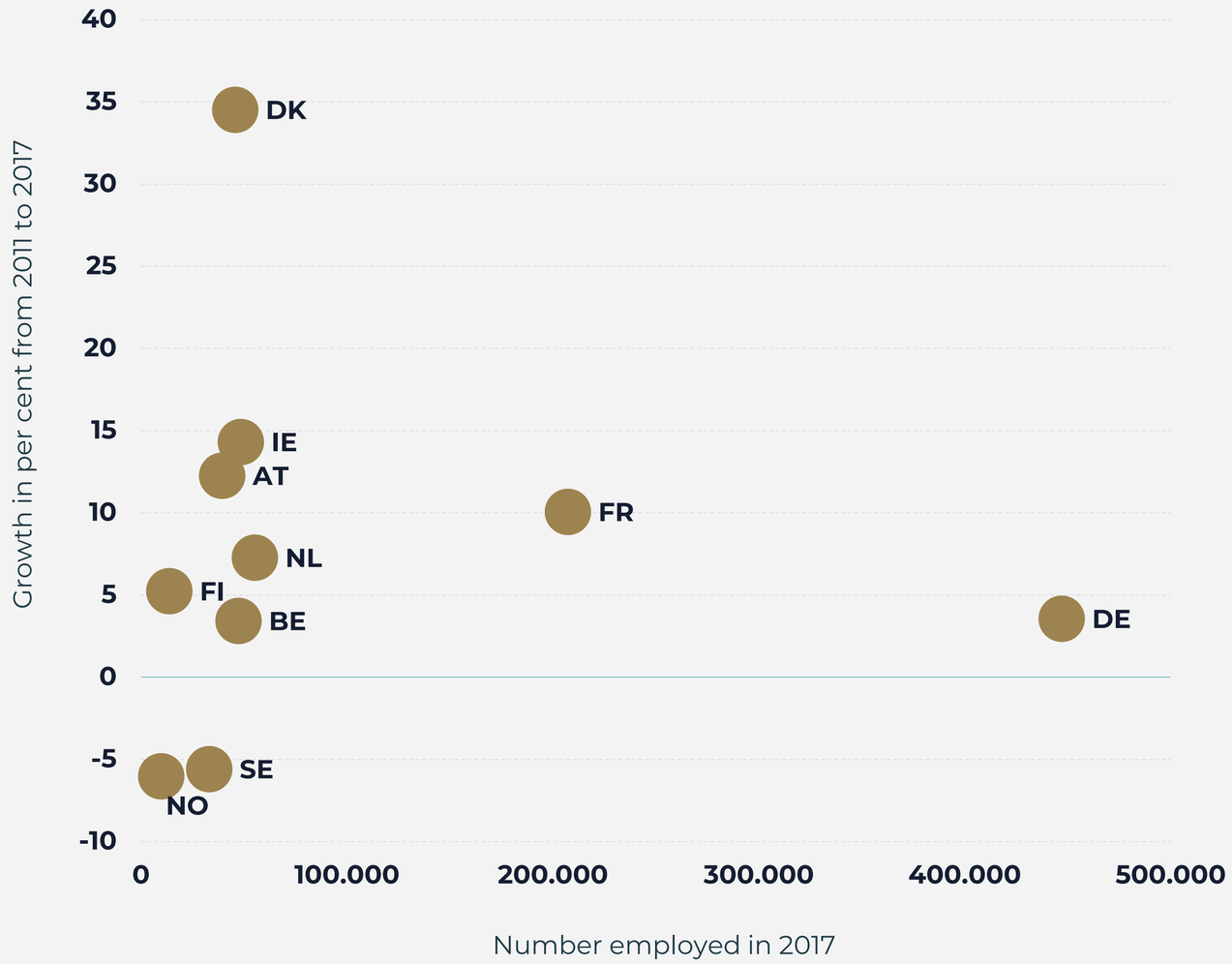
Employment in the life science industry in Europe

The figure shows the number of people employed in selected EU countries in 2017 compared with the growth in employment from 2011 to 2017.

With a growth of 36 per cent, Denmark has since 2011 had by far the largest growth in employment during the period, while the number of employed is roughly in line with several European countries.

Germany and France stand out with significantly more people employed in the life science industry than the other European countries included in the survey. Both Norway and Sweden have experienced a decline in employment during the period.

Number of employees in the life science industry and growth here from 2011-2017



Source: Ministry of Industry, Business and Financial Affairs 2020 based on Eurostat

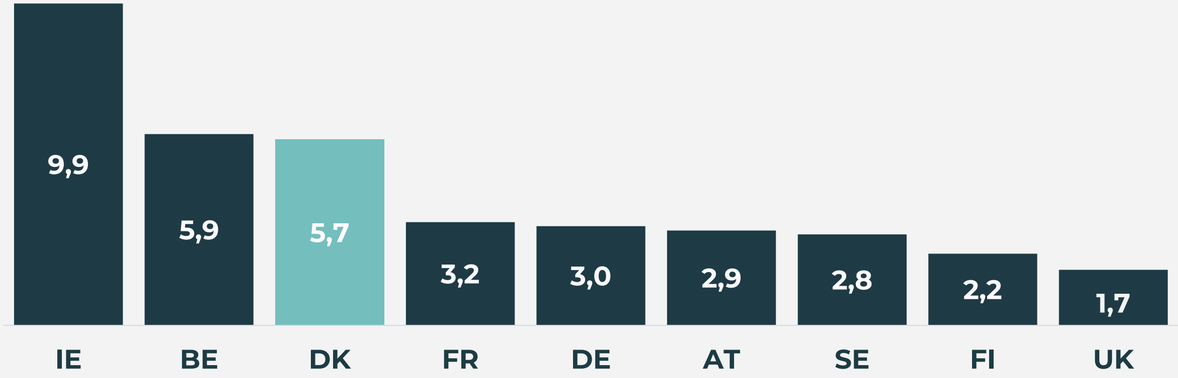
Turnover in the life science industry in Europe

In 2017, the turnover in the life science industry was just over 5.7 per cent of the total turnover in Denmark. The share of turnover in Denmark is only been surpassed by Belgium and Ireland. In Ireland, life science turnover was approx. 9.9 per cent of the total company turnover in 2017.

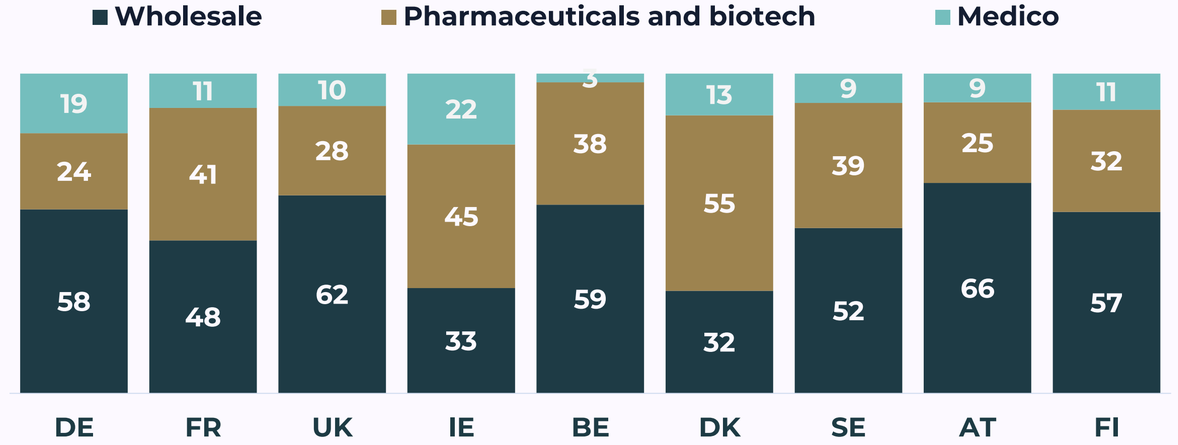
The Irish turnover stands out in particular by being driven by the turnover in the manufacture of both medical products as well as medicines and biotechnological preparations, whereas, for example, Belgium's turnover in life science is largely driven by wholesale trade with life science products. The Danish turnover stems mainly from pharmaceuticals and biotech.

Source: Ministry of Industry, Business and Financial Affairs 2020 based on Eurostat

Share of the country's total turnover stemming from the life science industry in selected European countries, 2017 (per cent)



Distribution of turnover across sectors, 2017 (per cent)

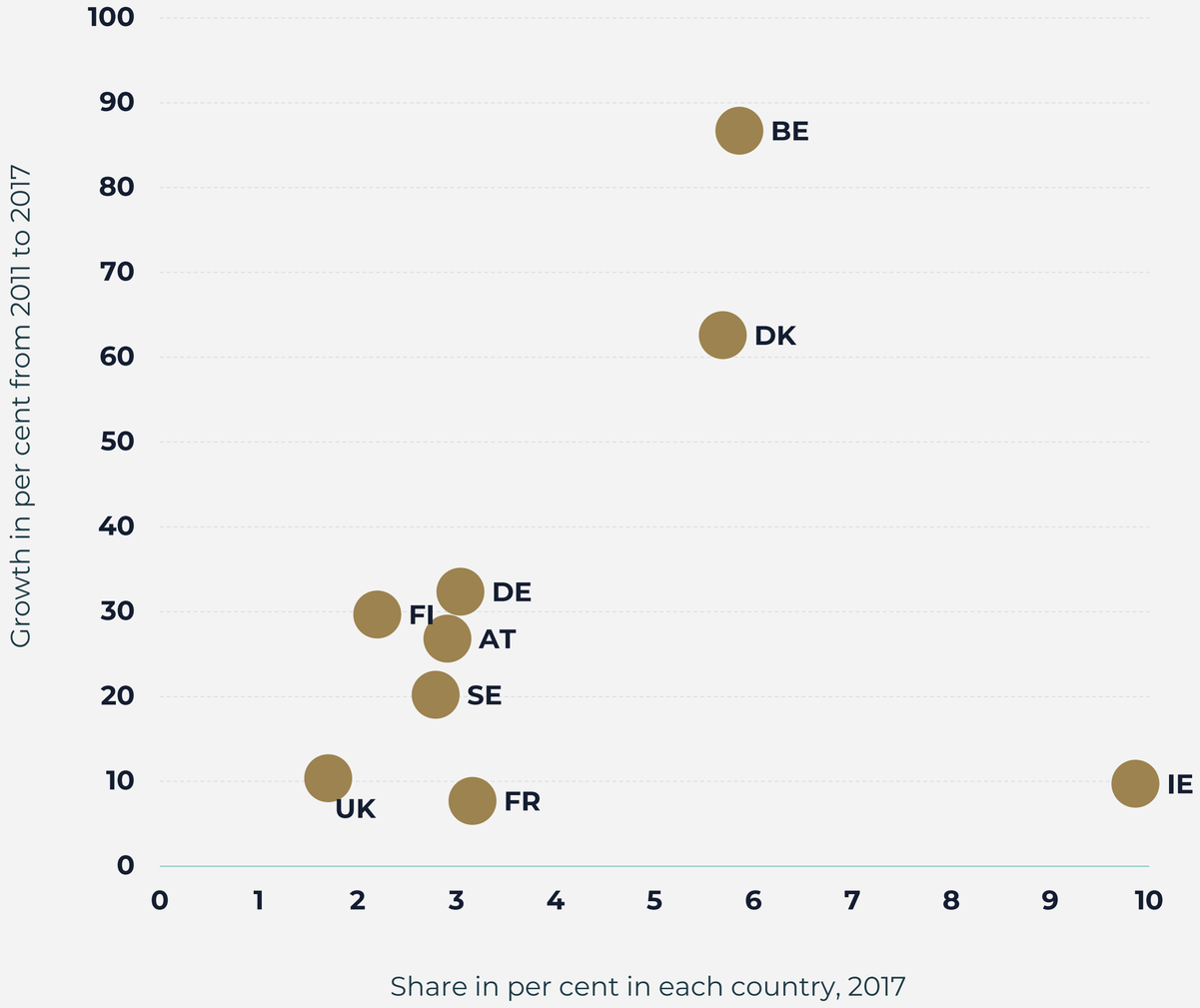


Turnover in the life science industry in Europe

The figure shows the turnover in the life science industry in selected EU countries in 2017 compared with the growth in turnover from 2011 to 2017.

Here it becomes clear that Denmark, with a growth of 63 per cent since 2011, together with Belgium are among the countries that have experienced the largest growth in turnover during the period. For Ireland, there is an unfortunate combination of a turnover that accounts for a relatively large part of the economy but which has experienced low growth compared to competing countries.

Share of turnover from the life science industry and growth from 2011-2017



Source: Ministry of Industry, Business and Financial Affairs 2020 based on Eurostat

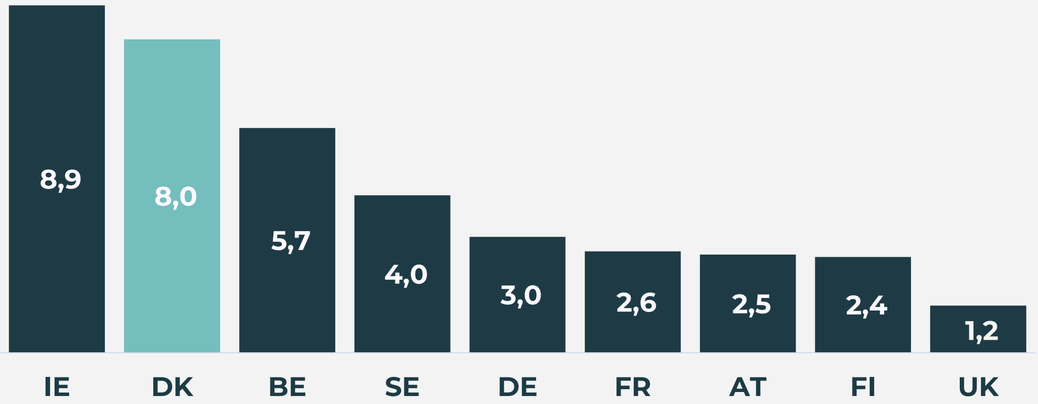
The value added in the life science industry in Europe

Denmark and Ireland are the two countries where value added from the life science industry is the most significant factor in the economy.

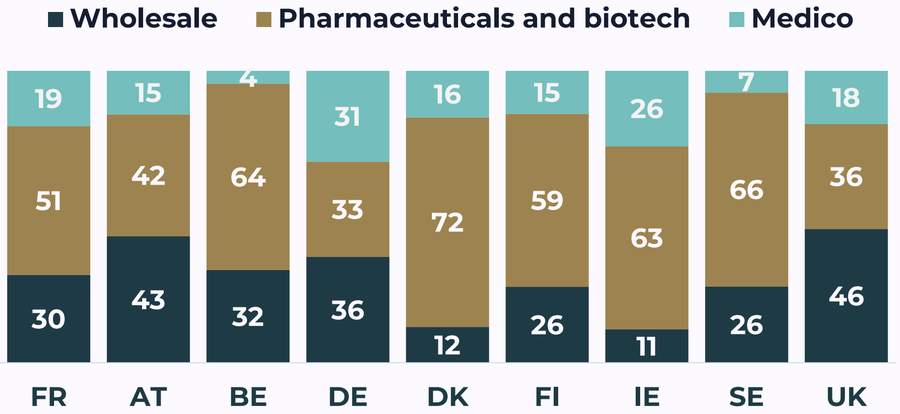
In Denmark and Ireland, the value added from pharmaceuticals and biotech is particularly significant. The UK is the country with the largest value creation from the medical industry.

Source: Ministry of Industry, Business and Financial Affairs 2020 based on Eurostat

Share of the country's total value added stemming from the life science industry in selected European countries, 2017 (per cent)



Distribution of value added across sectors, 2017 (per cent)



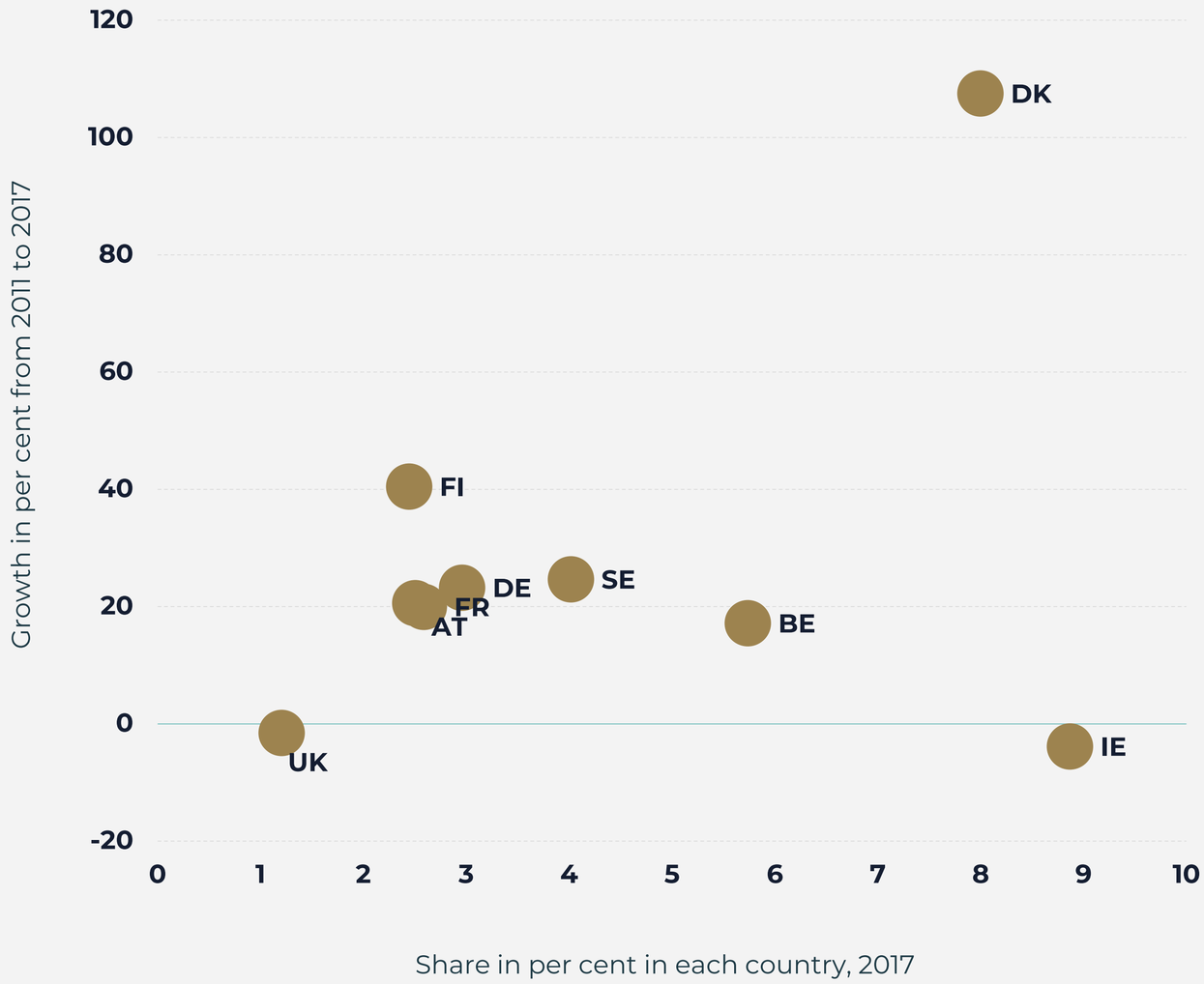
Value added in the life science industry in Europe

The figure shows the value added in the life science industry in selected EU countries in 2017 compared with the development in value added from 2011 to 2017.

Here it becomes clear that the value added from the life science industry has a significant impact on both Denmark, Germany and Belgium, but that Denmark is the country that has experienced the largest growth by far.

Ireland has had negative growth of 4% between 2011 and 2017.

Share of value added from the life science industry and growth from 2011-2017



Source: Ministry of Industry, Business and Financial Affairs 2020 based on Eurostat

Productivity in selected countries

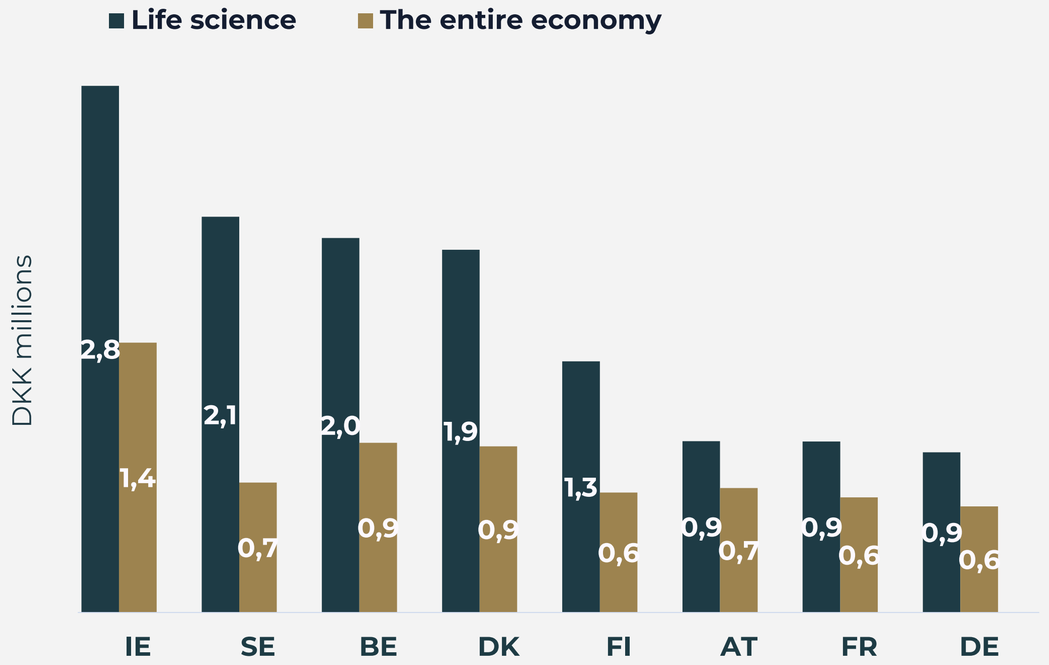
The figure shows the productivity of the life science industry compared to the productivity of the overall economy in 2017.

Across the various countries, the life science industry generally experiences a high level of productivity compared to the productivity of the rest of the economy.

The life science industry in Denmark is relatively productive compared to the other EU countries. However, Ireland's life science industry is the most productive at DKK 2.8 million per man-year. This is because Ireland has about the same number of people in life science as Denmark, but they create almost twice as much value added. As in Denmark, the pharmaceutical industry in Ireland is particularly productive.

Note: The productivity figures, like the other figures in the international comparison, are not directly comparable with the productivity figures that appear at the beginning of the publication. This is because the European industry definition is not as precise as the one that can be applied to Danish data.

Productivity in life science and the entire economy, 2017



Source: Ministry of Industry, Business and Financial Affairs 2020 based on Statistics Denmark
Note: Productivity in life science is established by dividing the total value added in life science by the total number of man-years employed in life science. The total level of productivity is also calculated by dividing the total value added of the economy by its total number of man-years. There is a lot of missing information in NL, NO, UK and EU28 for productivity. In addition, the level of productivity of Ireland needs to be interpreted with caution, as Ireland also has several missing pieces of information.

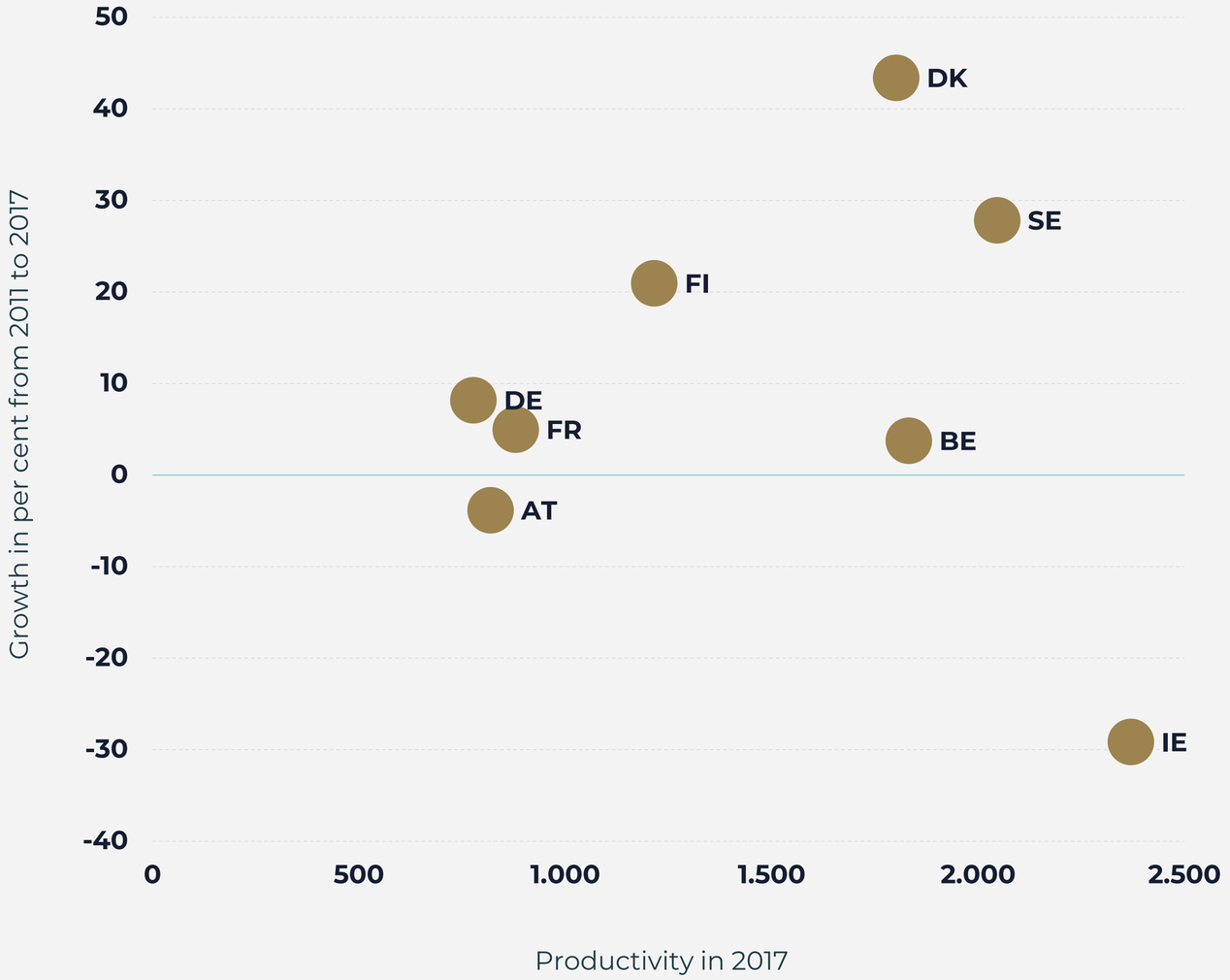
Productivity in the life science industry in Europe

The figure shows the productivity in the life science industry in selected EU countries in 2017 compared with the development in productivity from 2011 to 2017.

It clearly establishes that Denmark is the country that has had the greatest growth in productivity during the period. While Ireland and Sweden are the countries with the highest productivity.

However, the high productivity in Ireland may be due to the fact that Ireland has attracted intellectual property rights from multinational companies to Irish subsidiaries for a period of time due to favourable tax conditions. This has increased Ireland's calculated trade and thereby the value added, which has created an "artificial" high productivity. The relatively large drop in productivity of just over 30 per cent during the period may similarly be due to the transfer of assets in multinational companies.

Productivity in the life science industry and growth of this industry from 2011-2017



Source: Ministry of Industry, Business and Financial Affairs 2020 based on Eurostat

The climate footprint of the life science industry

Theme

Life science and the climate

1. Introduction to decoupling and green growth
2. Emissions and resource consumption in the life science industry and in the business sector in general
3. Energy consumption in the life science industry and in other industries
4. Emissions, energy and resource consumption among 10 large life science companies in Denmark

Green theme: The climate and resource footprint of the life science industry

Through the Paris Agreement, Denmark has committed itself to working actively to keep the global temperature rise below 1.5 ℃. In continuation of this, the Climate Act (2019) has set a binding sub-goal of 70 per cent fewer greenhouse gases in Denmark in 2030 compared to 1990.

This theme sheds light on the climate and resource footprint of the life science industry. The industry is characterised by having a relatively low climate impact in relation to value creation. This theme takes a closer look at the concepts of "green growth", "grey growth" and "true green growth" and CO2 productivity. In addition, a closer look at the general resource utilisation in the industry and how efficient the industry is at creating value in connection with the consumption of waste and water. In addition, light is shed on the industry's energy consumption, as the use of energy creates greenhouse gas emission, and the composition of the energy consumption affects the magnitude of greenhouse gas emissions.

The government, together with the business sector, has established 13 climate partnerships, where they collaborate on initiatives that reduce the business sector's emissions of greenhouse gases and strengthen the companies' green competitiveness. One of the partnerships includes the companies in Life science and biotech. The theme of the climate and resource footprint of the life science industry includes the industry delimitation used in the rest of the analysis.

[1]The 5 per cent is set as an absolute minimum. Stoknes, P. E. therefore recommends a target of 7 per cent growth in CO2 productivity.

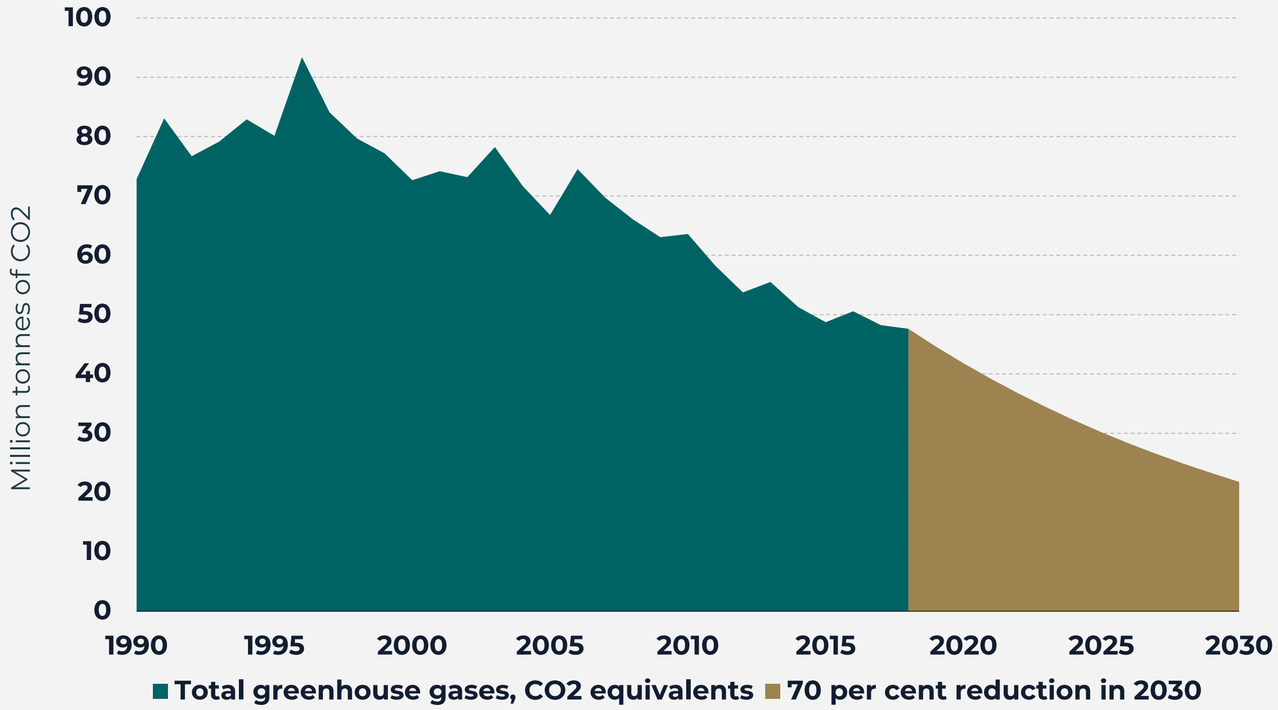
Climate goal

In order to reach the 70% target, Danish greenhouse gas emissions must drop to around 22 million tonnes in 2030. The figure shows Denmark's actual greenhouse gas emissions and the extent to which emissions must be reduced in the future to meet the 70% target.

The precondition for economic growth objectives as well as the objectives in the Climate Act entails a shift to green production and growth. The premise of green growth is largely related to the concept of decoupling, i.e. growth without a corresponding increase in emissions.

Emissions in the life science industry have fallen by just over 50 per cent during the period. At the same time as very high growth rates.

By 2030, Denmark must have reduced greenhouse gas emissions by 70 per cent.



Source: Green theme prepared by Damvad analytics for the Ministry of Industry, Business and Financial Affairs 2020

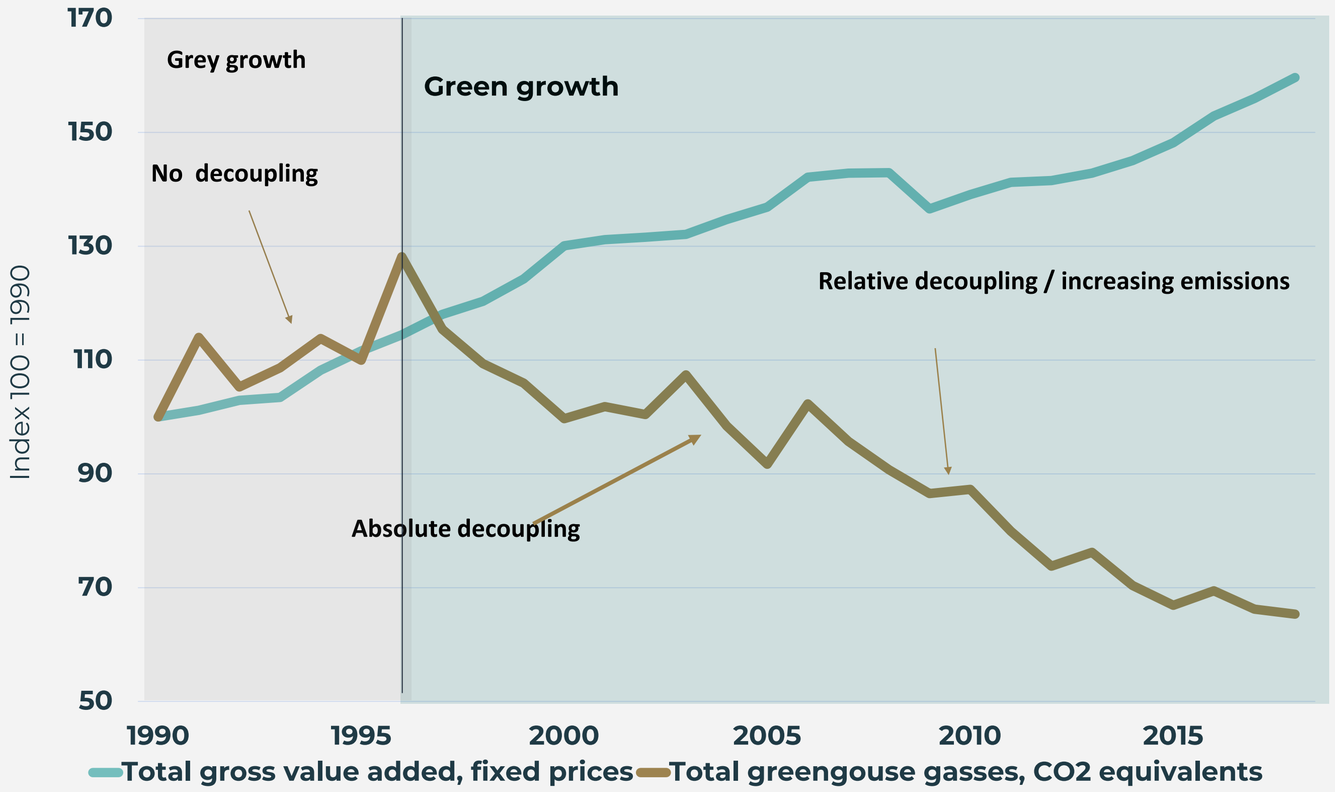
Decoupling and green growth

Decoupling is generally about separating emissions from production in a given production process. Decoupling can be understood in a relative as well as absolute sense. **Relative decoupling** implies that the emission curve rises more slowly than the production curve. In other words, there is growth in the emissions, but this is not as high as the growth in value creation. **Absolute decoupling,** on the other hand, implies such large increases in efficiency that the emission curve drops. The figure shows examples of relative and absolute decoupling for Denmark.

In the green transition, a distinction can also be made between grey growth and green growth.
Grey growth is defined as economic growth that leads to an absolute increase in the greenhouse gas emissions.
Green growth leads to an absolute decrease in emissions, i.e. ultimately there is absolute decoupling.

Absolute decoupling is thus a necessary precondition for green growth.

Danish discharge of greenhouse gases compared with development in gross value added



Source: DAMVAD Analytics based on the green national accounts and the national accounts from Statistics Denmark.

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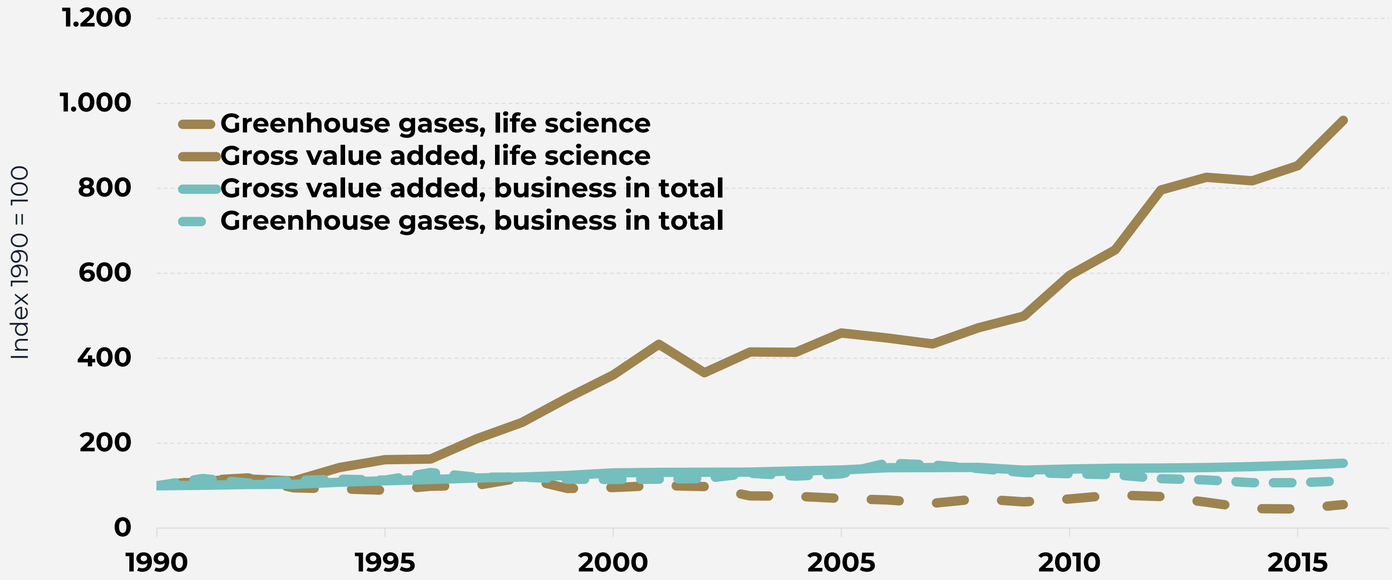
Extensive decoupling between growth and emissions in life science

In the period 1990-2017, the life science industry experienced strong economic growth measured by gross value added. During the same period, the life science industry succeeded in reducing their absolute greenhouse gas emission, while this remained unchanged for the Danish business sector.

Gross value added in the life science industry thus increased almost tenfold since 1990, while greenhouse gas emission dropped by just over 50 per cent. *

For the private business sector, greenhouse gases have risen by 11 per cent, while gross value added has risen by just over 50 per cent since 1990.

Development in gross value added (GVA) compared with greenhouse gas emissions, life science and the Danish business sector in relation to the 1990 level



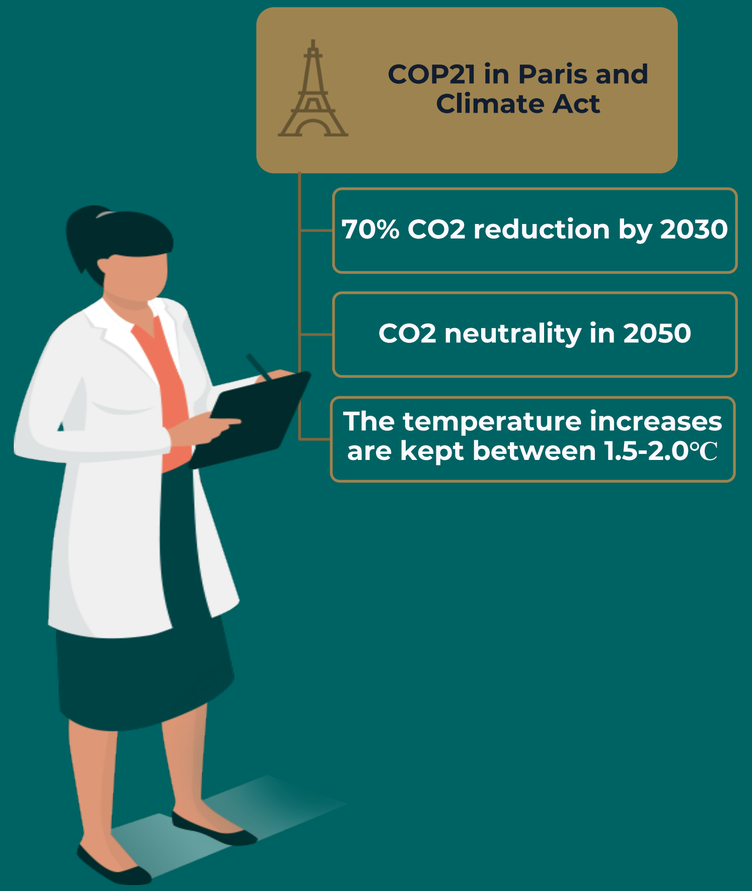
Source: DAMVAD Analytics based on the green national accounts and the national accounts from Statistics Denmark.
*Note: Only the following industries have been included here: *Pharmaceutical industry* (210000) and *Manufacture of medicinal products, etc.* (320010). This means that, in particular, many medical companies are not included. This is due to a rough industry division in the green national accounts. The figure is thus not comparable with figures for emissions published in connection with the climate partnerships.

Green growth, true green growth and C02 productivity

The challenge of the traditional green growth concept is that it is not clearly defined how much emissions need to fall in order to have sustainable growth. Growth can thus be green without being compatible with either the Paris Agreement or the Climate Act. This is the motivation behind the concept of 'true green growth'.

True green growth refers to economic growth, where increases in CO2 productivity (BVT shared with C02 emissions) are large enough to be compatible with the 2050 CO2 neutrality target. Stoknes, P. E., & Rockström, J. (2018) estimates that an increase in CO2 productivity of 5 percent per year qualifies for true green growth[1].

The advantage of this concept, in addition to meeting the internationally agreed objectives, is to take account of internal market shifts. For example, it can be difficult for industries experiencing high economic growth to live up to green growth in the traditional sense. This problem does not apply to genuine green growth, as the 5% per an year applies to all industries. Note that it follows from the definition that true green growth can be both grey and green, as you can have true green growth by the fact that CO2 productivity is above 5%, while there is an absolute increase in CO2 emissions.



[1]The percentage is set as a minimum. Stoknes, P. E. therefore recommends a target of 7 percentage growth i CO2 productivity.

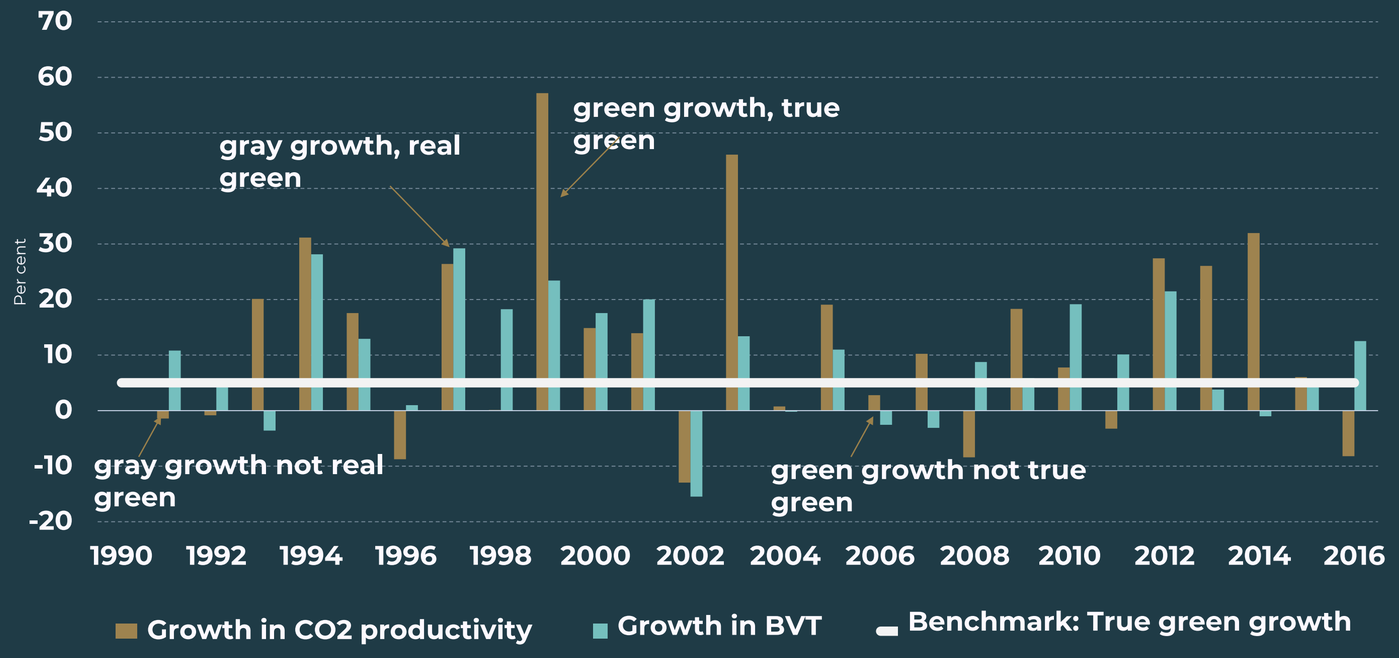
The growth in life science is primarily true green

If the growth in gross value added and the emission of greenhouse gases in the life science industry are compared year by year, it can be seen that the industry has experienced gray, green and true green growth in the years since 1990.

For example, in 2006, growth in CO2 productivity was below 5 per cent, which means the growth was not "true green".

The growth in the life science industry has been mainly green and true green since 1990. Note that all three growth concepts should be seen in light of the high growth in gross value added that has characterised the life science industry during the period. In addition, it should be noted that not all life science companies are included in these calculations (see note for details).

Growth in gross productivity and CO2 productivity in the life science industry

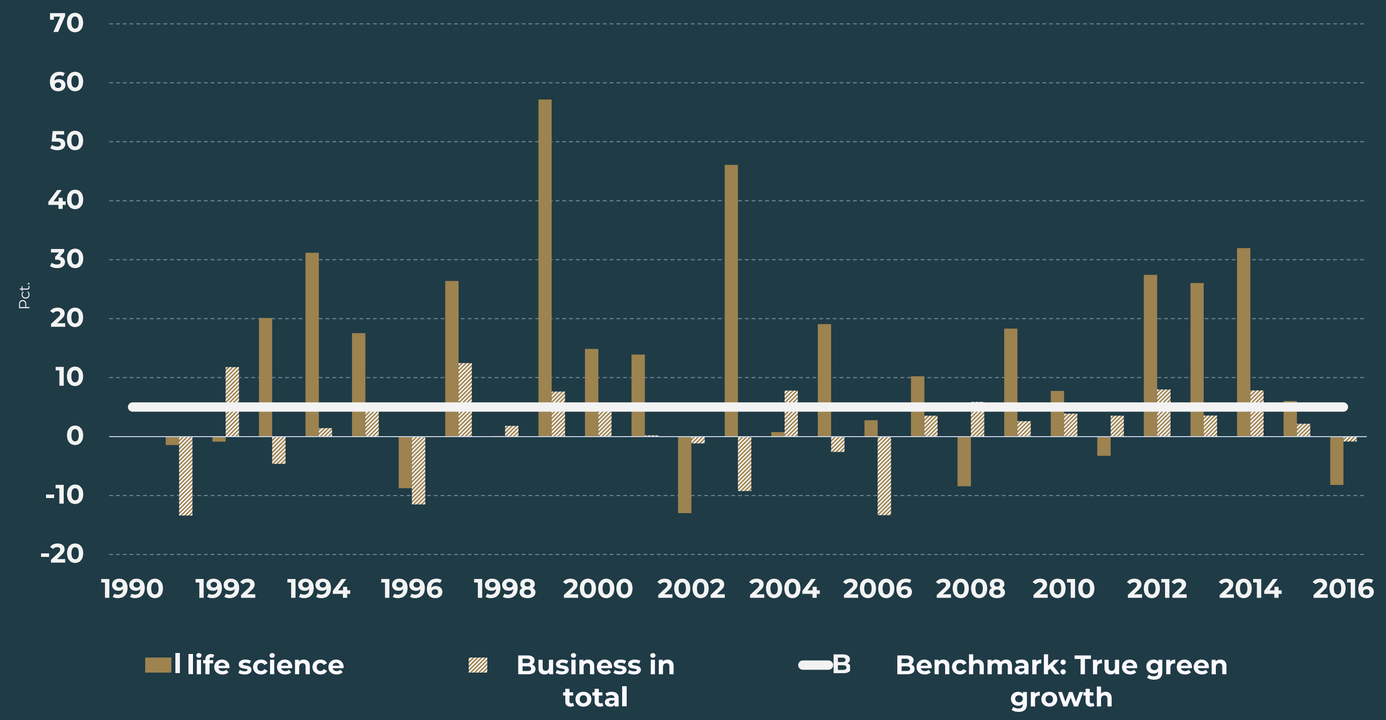


Source: DAMVAD Analytics based on the green national accounts and the national accounts from Statistics Denmark.
*Note: Only the following industries have been included here: Pharmaceutical industry (210000) and Manufacture of medicinal products, etc. (320010). This means that, in particular, many medical companies are not included. This is due to a rough industry division in the green national accounts. Definitions regarding gray, green and true green growth are based on Stoknes, PE, & Rockström, J. (2018). Note that the 5 per cent are set as an absolute minimum. Stoknes, P. E. therefore recommends a target of 7 per cent growth in CO2 productivity. CO2 productivity is calculated on the basis of CO2 equivalents of total greenhouse gas emission.

The growth in the Danish business sector is mostly green - but not always "true green"

In most years between 1990 and 2016, the life science industry has achieved a growth in CO2 productivity that is far higher than the corresponding growth in the CO2 productivity for the Danish business sector. Since 1990, the growth in the life science industry has mainly been true green, which is not the case for the general Danish business sector. This is primarily due to the high growth in gross value added that the life science industry has managed to generate in combination with declining emissions.

Growth in CO2 productivity in life science and the business sector in general, 1990 to 2016



Source: DAMVAD Analytics based on the green national accounts and the national accounts from Statistics Denmark.
*Note: Only the following industries have been included here: Pharmaceutical industry (210000) and Manufacture of medicinal products, etc. (320010). This means that, in particular, many medical companies are not included. This is due to a rough industry division in the green national accounts. Definitions regarding gray, green and true green growth are based on Stoknes, PE, & Rockström, J. (2018). Note that the 5 per cent are set as an absolute minimum. Stoknes, P. E. therefore recommends a target of 7 per cent growth in CO2 productivity. CO2 productivity is calculated on the basis of CO2 equivalents of total greenhouse gas emission.

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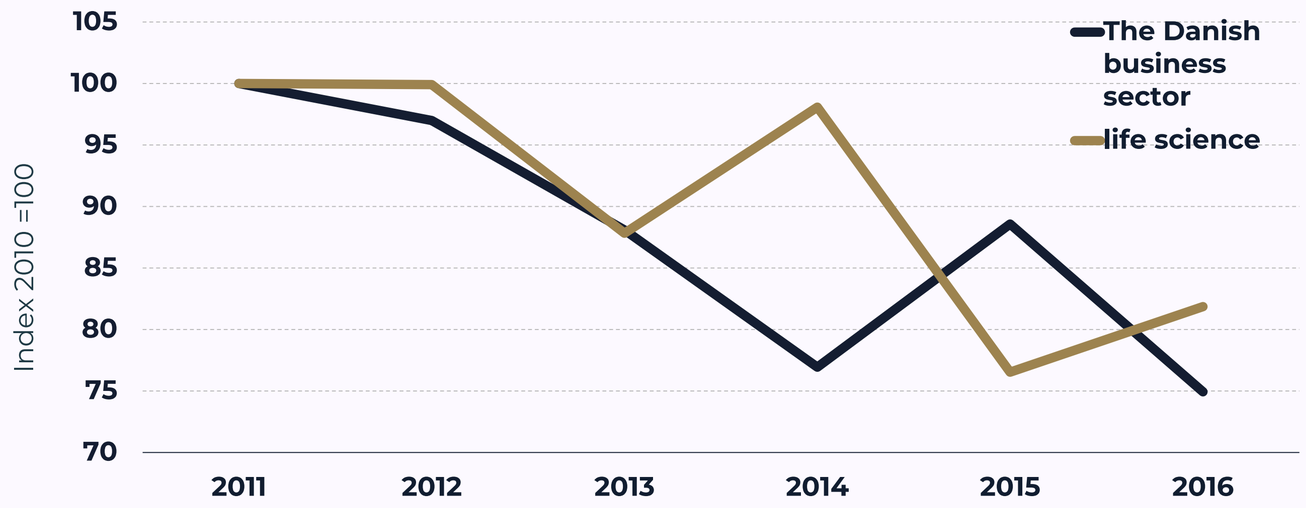
Waste Productivity

The development in waste productivity (GVA/waste production) has been negative for both the life science industry and the Danish business sector in the period 2011-2016. The life science industry's waste productivity was 18 per cent lower in 2016 than in 2011, i.e. the life science industry has used more waste to create the same value in 2016 as in 2011. However, the decline in the efficiency of waste production has been even greater for the Danish business sector.

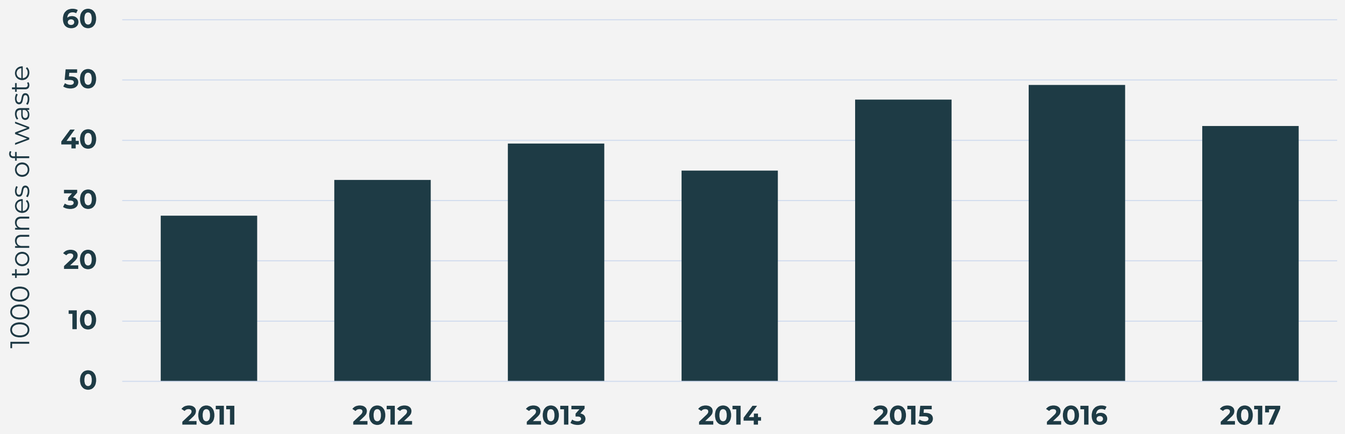
In absolute numbers, waste production in the life science industry has increased by approx. 15,000 tonnes from 2011 to 2017. This may be due to production being expanded or brought home from abroad.

Source: DAMVAD Analytics based on the green national accounts and the national accounts from Statistics Denmark.
*Note: Only the following industries have been included here: Pharmaceutical industry (210000) and Manufacture of medicinal products, etc. (320010). This means that, in particular, many life science companies are not included. This is due to a rough industry division in the green national accounts. The business sector in general consists of the industries A-N. Resource productivity is defined as GVA in constant prices relative to consumption of resources (consumption of water and production of waste including land).

Development in Waste Productivity



Waste production in Danish life science



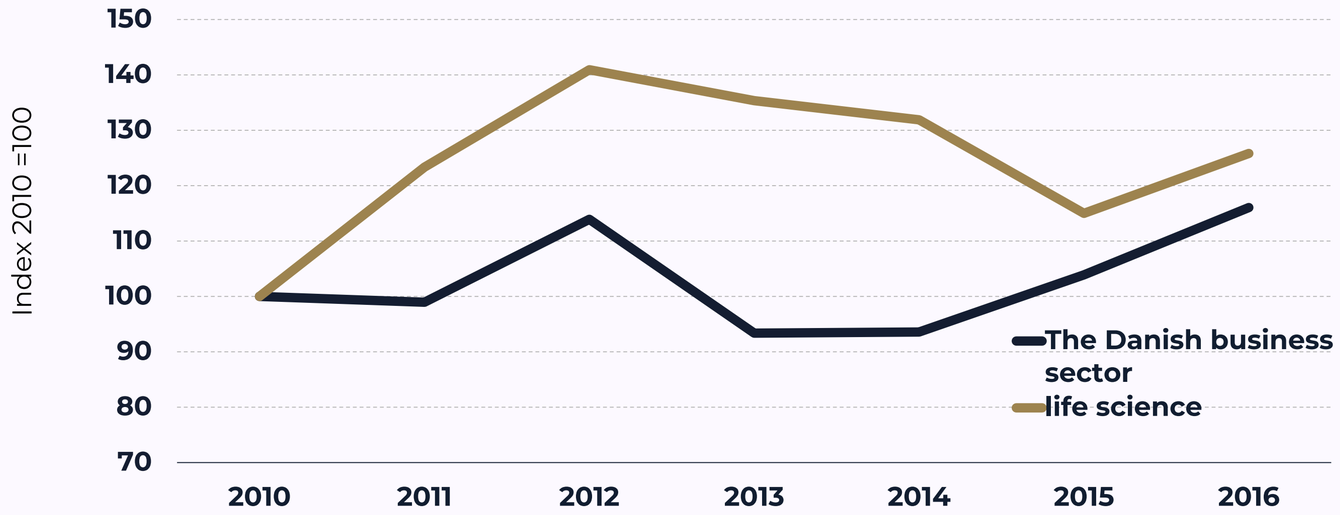
Water productivity

The development in water productivity (GVA/water consumption) shows that the life science industry has streamlined their water consumption more than the general Danish business sector in the period 2010-2016.
In 2016, the life science industry's consumption of water was almost 26 per cent more efficient than in 2010.

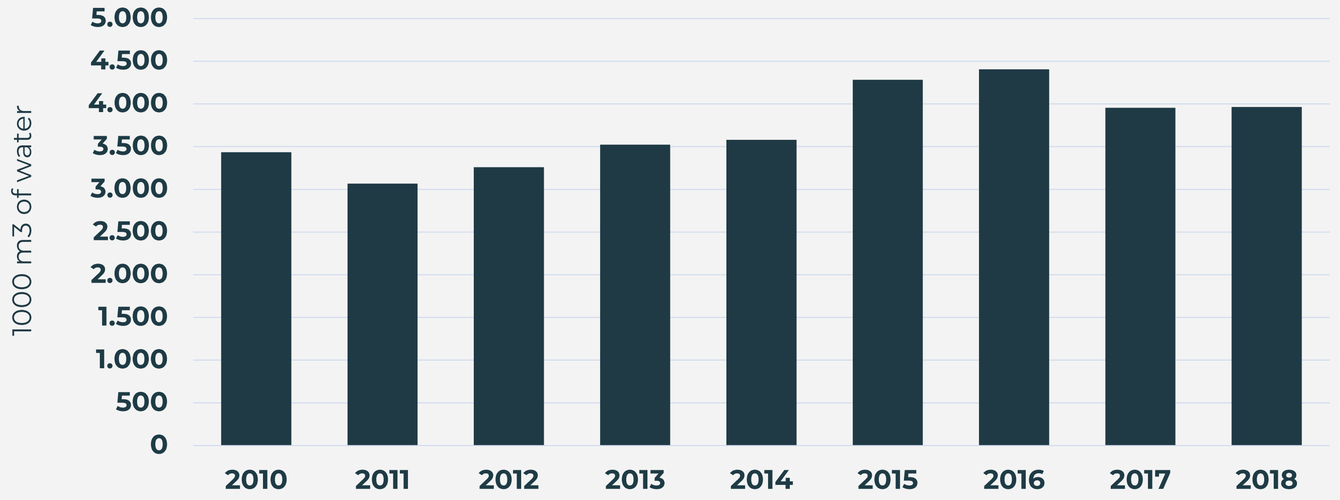
The consumption of water in the life science industry has increased by 529 thousand cubic meters during the period.

Source: DAMVAD Analytics based on the green national accounts and the national accounts from Statistics Denmark.
*Note: Only the following industries have been included here: Pharmaceutical industry (210000) and Manufacture of medicinal products, etc. (320010). This means that, in particular, many life science companies are not included. This is due to a rough industry division in the green national accounts. The business sector in general consists of the industries A-N. Resource productivity is defined as GVA in constant prices relative to consumption of resources (consumption of water and production of waste including land).

Development in water productivity



Consumption of water in the life science industry



Introduction to energy data and consumption

This section examines the energy consumption of life science companies and the development in its composition. The companies' energy consumption is examined, as the use of energy creates greenhouse gas emissions and the composition of the energy consumption affects the magnitude of the greenhouse gas emission.

To shed light on energy consumption, and its composition, the data set "The Industry's Energy Consumption" from Statistics Denmark is used. Based on the data set, it is possible to uncover the size and composition of energy consumption in Danish workplaces within the industrial sector[1].

The electricity companies' composition of energy consumption - also called electricity mix - is determined by a large number of factors, e.g. the time when the electricity is used, whether the wind blows at the given time, etc., and it is not immediately possible for the individual companies to control. For a detailed calculation of the average Danish electricity mix, please refer to Energinet's environmental and electricity declarations.

In continuation of the above, it should be noted that the life science industry has procured many green certificates in recent years. In the green certificate system, electricity consumers buy certificates, which are then given to energy producers of renewable energy (RE). The energy producers thus have an incentive to invest in RE, as they obtain an extra income from the sale of green certificates. The life science industry has thus tried to ensure that the electricity it buys is based on renewable energy rather than fossil fuels, such as coal and oil.

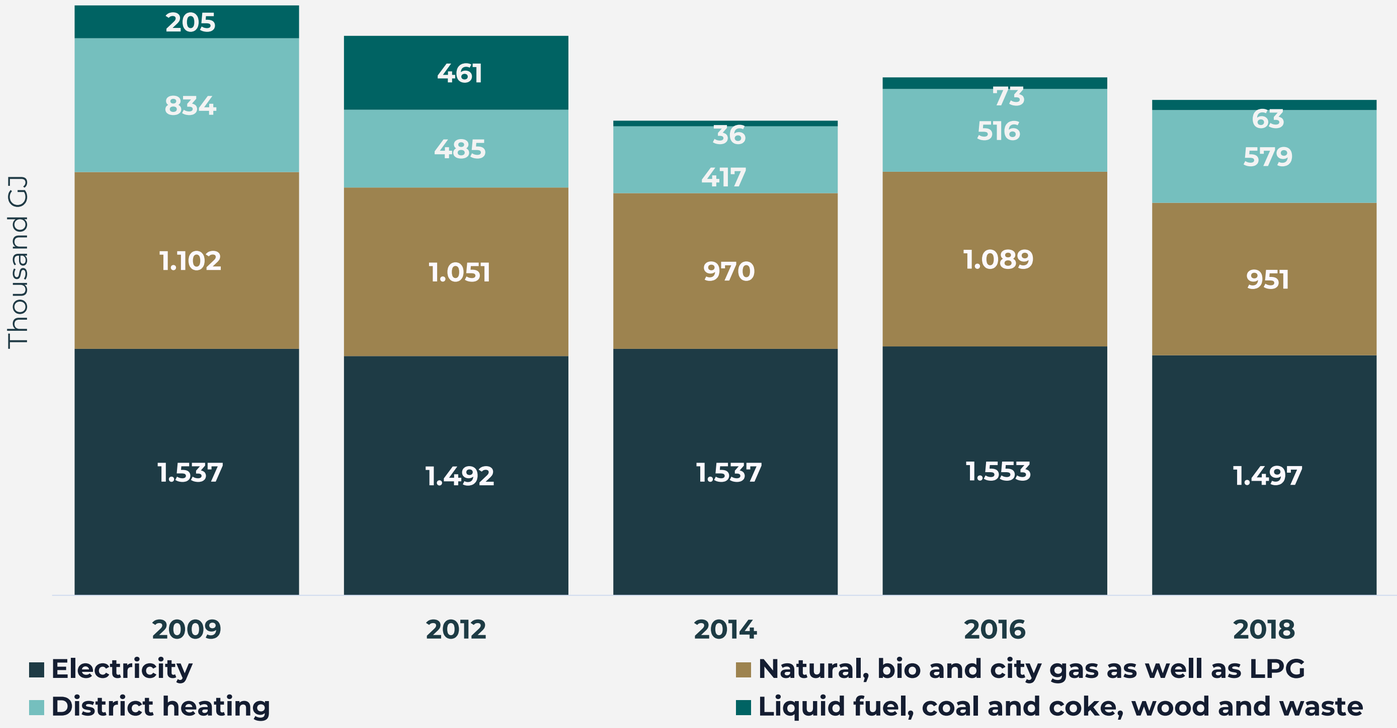
[1]Note: The data set covers a very detailed classification of energy consumption for companies with at least 20 employees in the industrial sector. The classification covers, inter alia, electricity, gas, coal and oil. In this context, it should be noted that the consumption of, for example, coal and oil only reflects the direct use in production in industry. The consumption of coal and oil in the production of electricity at the energy companies is thus not reflected in the consumption of coal and oil in the data set.
In addition, the data set contains only information about companies in the industrial sector and of a certain size, which is why this sub-analysis only includes life science companies which are manufacturing companies and relatively large. Therefore, as was the case in section 2, this sub-analysis does not cover all life science companies. However, the sub-analysis can still provide a good indication of the climate footprint in the life science industry compared with other industries.

The total energy consumption has been declining since 2009

The life science industry's relative consumption of electricity has grown in the period 2009-2018. However, this development is not due to an absolute increase in the consumption of electricity, but rather to the fact that the life science industry has succeeded in reducing its absolute consumption from other energy sources during the period. In total, energy consumption has fallen by just over 20 per cent. When energy consumption from other energy sources decreases, the share of electricity increases when electricity consumption is relatively fixed during the period.

Based on energy data, it has unfortunately not been possible to shed light on the specific measures that the life science industry has used to reduce energy consumption in the period 2009-2018.

Energy consumption in life science by energy type and time, absolute



Source: DAMVAD Analytics based on The Industry's Energy Consumption from Statistics Denmark
Note: Small fluctuations between the years may be due to small population sizes, as not all life science companies are included. The life science population from 2016 is projected to make up the population in 2018.

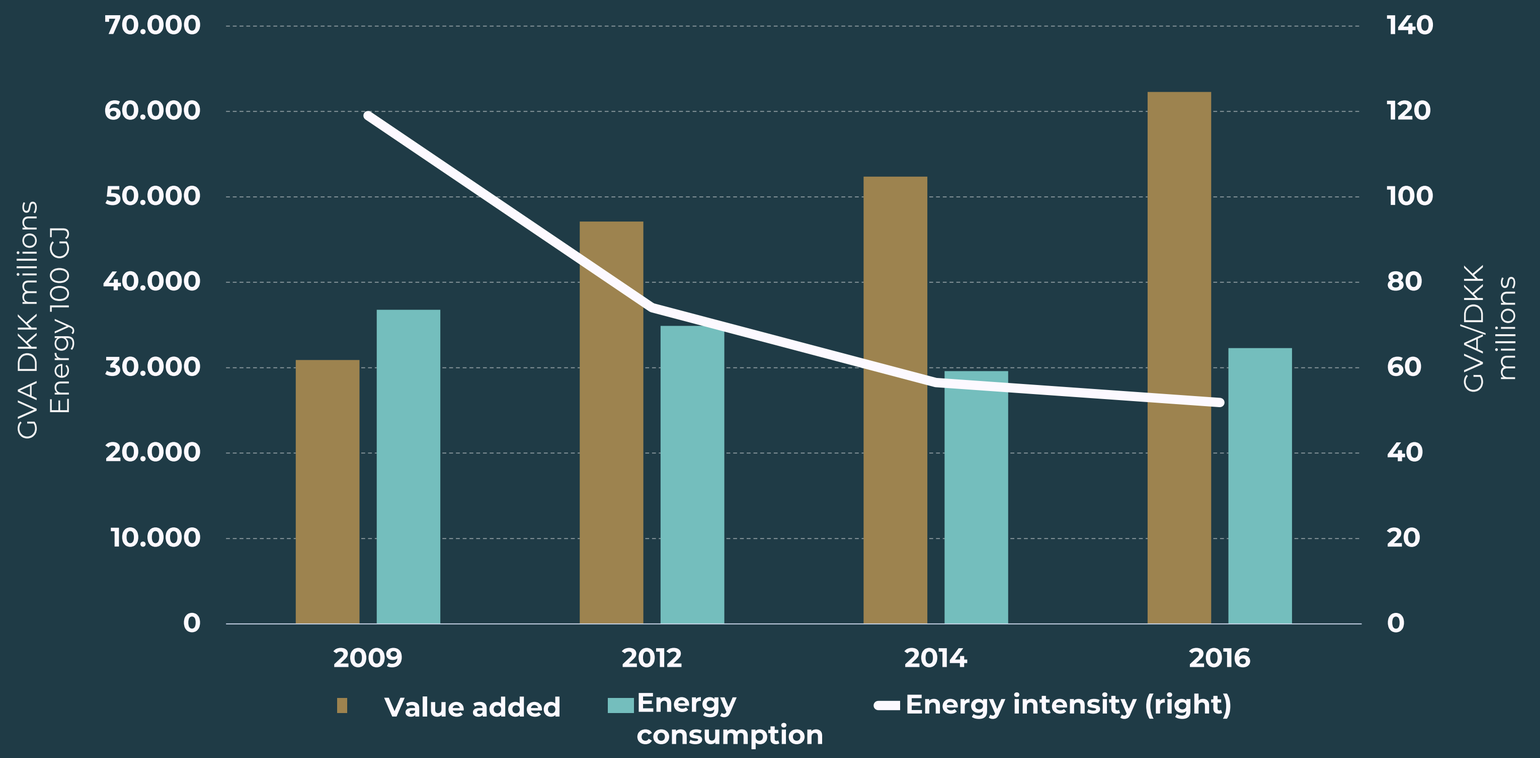
Declining energy consumption in the life science industry is due to a more energy efficient production

A decrease in energy consumption in a particular sector can be driven either because production has decreased or because production has become more energy efficient.

To assess how energy efficient a given production is, the term "energy intensity" is often used. Energy intensity is defined as energy consumption in relation to value added at a given production. In this case, it is positive to have a low energy intensity.

In the period 2009-2016, the value added in the life science industry doubled. When the total energy consumption dropped in the same period, it was due to an effort to improve energy efficiency which led to a decrease in energy intensity in the life science industry of over 50 per cent from 2009-2016.

Value added, energy consumption and energy intensity in life science, 2009-2016



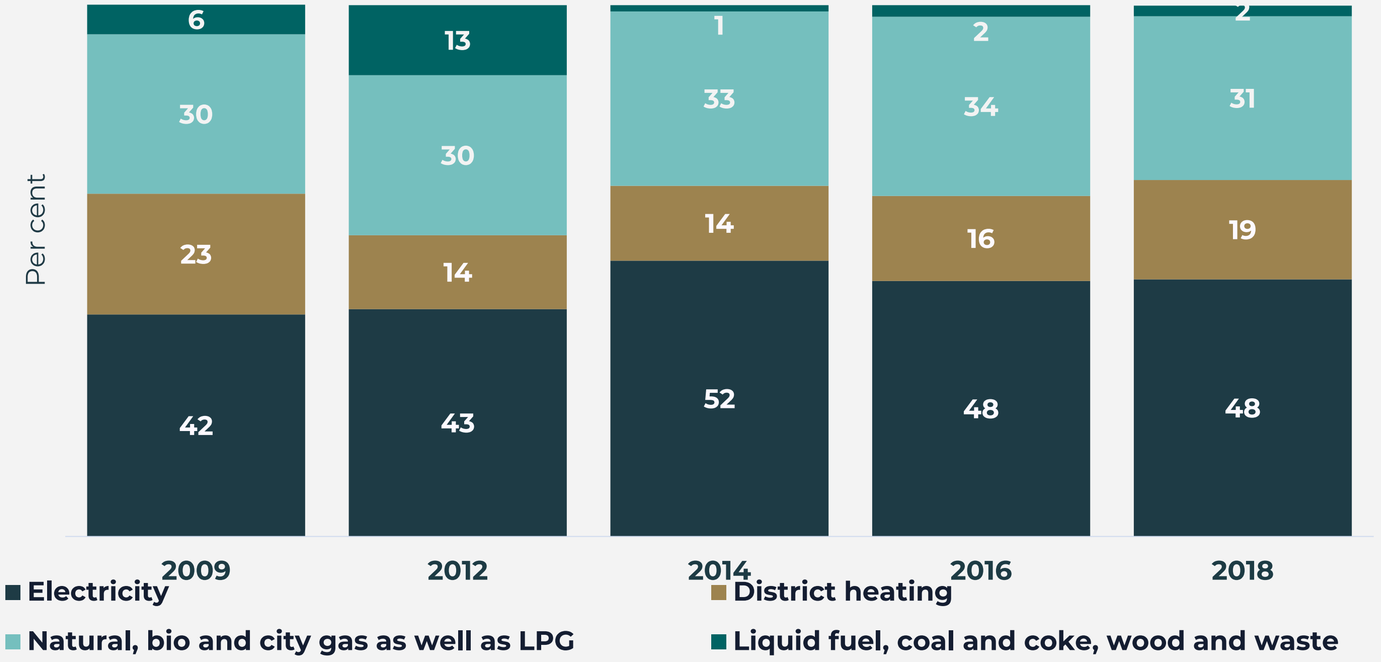
Source: DAMVAD Analytics based on Industry's Energy Consumption and Company Statistics from Statistics Denmark
Note: Energy intensity is defined here as energy consumption in relation to value added.
[1]Note that value added is calculated in current prices. The overall decrease in intensity should thus be seen in the context of an annual inflation of around 1.5% from 2009-2016.

The life science industry uses relatively more electricity in 2018 than in 2009

Production in the life science industry has become more electrically powered since 2009, but the share of electricity in production has fallen slightly since 2014. In 2009, electricity accounted for almost 42 per cent of total energy consumption in the life science industry, while in 2018 it amounted to just over 48 per cent. During the same period, the consumption of liquid fuel, coal and coke, wood and waste decreased, as did consumption of district heating, which however, is started rising again at the end of the period.

The fact that the life science industry's energy consumption consists of electricity to a greater extent than before may indicate that the industry has begun a green transition. After all, the production of electricity in Denmark is relatively green. In 2018, renewable energy accounted for more than 60 per cent of the energy from Denmark's electricity supply. The goal is also for 100 per cent of the energy to be renewable energy by 2030. For Denmark, renewable energy consists mainly of wind energy and the burning of biofuels, which are considered to be emission-efficient.

The energy consumption in the life science industry by energy type and time, share in per cent.



Source: DAMVAD Analytics based on The Industry's Energy Consumption from Statistics Denmark. Note: Small fluctuations between the years may be due to small population sizes, as not all life science companies are included. The life science population from 2016 is projected to constitute the population in 2018. The share of renewable energy in the electricity mix consumed in the life science industry is not immediately possible to calculate

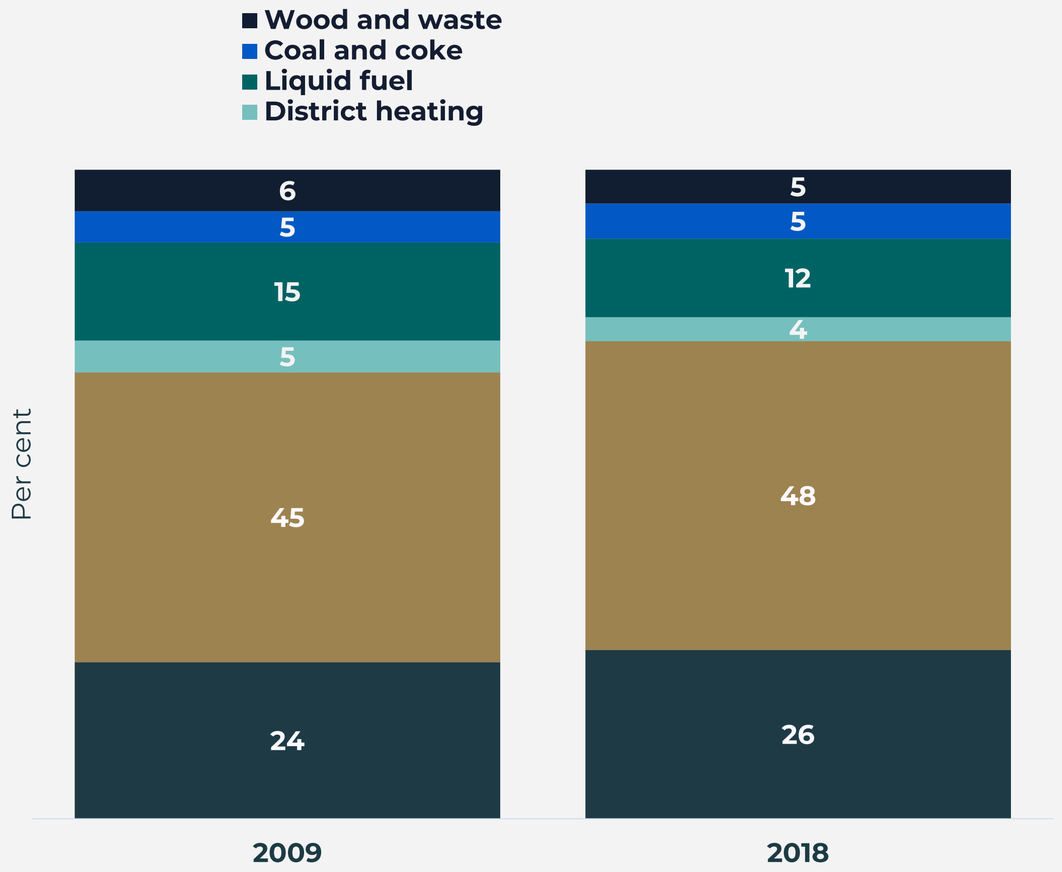
The composition of energy consumption in Danish industry

Overall, there have been no major changes in the composition of energy consumption in Danish industry in the period 2009-2018. Electricity and gas are still the most significant types of energy.

Electricity has risen from 24 per cent of total energy consumption in industry in 2009 to 26 per cent of total energy consumption in 2018. By comparison, electricity accounted for 48 per cent of the energy consumption in Danish life science in 2018. Electricity thus accounts for a much smaller share of total energy consumption in Danish industry than in the life science industry. In addition, liquid fuel as well as coal and coke make up a relatively large share of the total energy consumption in Danish industry in general throughout the entire period.

Compared with Danish industry in general, the life science industry is thus relatively green. However, it is a difficult basis for comparison, as some industries are very different from the life science industry, e.g. the plastics, glass and concrete industries.

Energy consumption in industry by energy type, share in per cent



Source: DAMVAD Analytics based on The Industry's Energy Consumption from Statistics Denmark
Note: Small fluctuations between the years may be due to small population sizes, as not all life science companies are included. The life science population from 2016 is projected to make up the population in 2018.

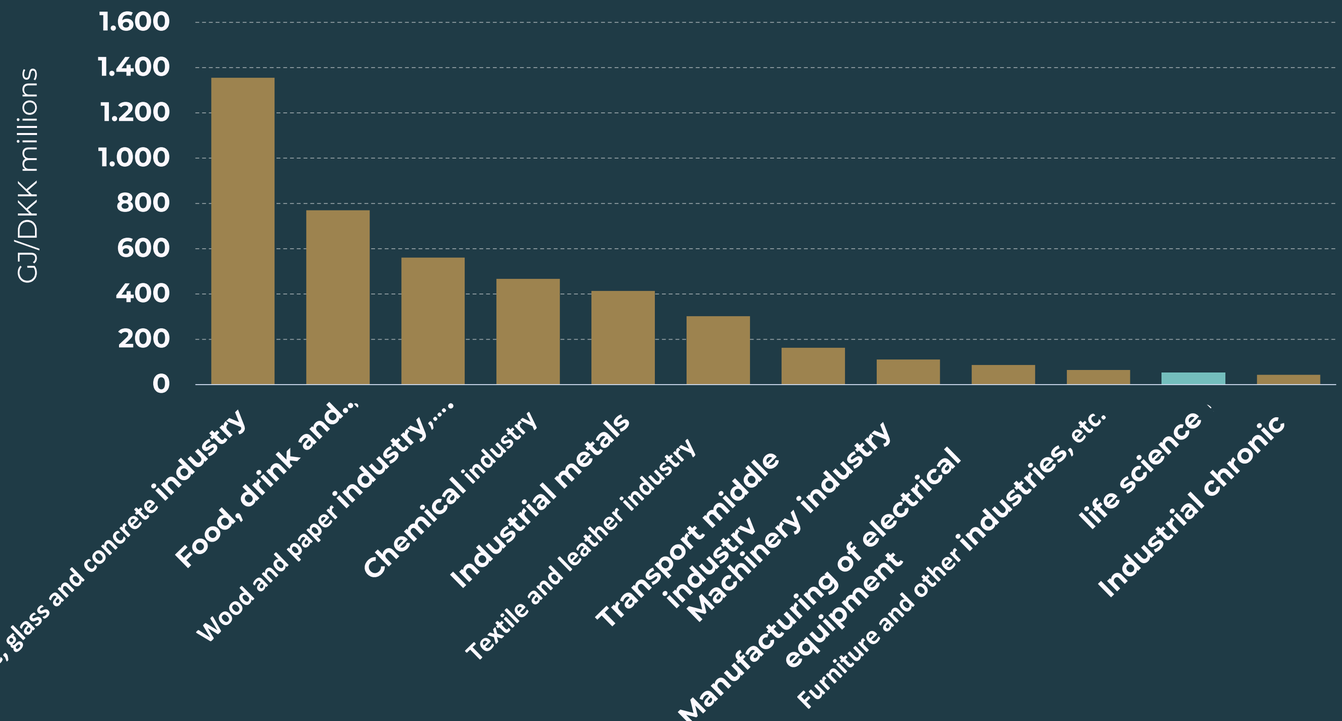
The energy intensity of the life science industry is low compared to other industries

The energy intensity of the life science industry is at the low end compared to a number of other industries. The life science industry's contribution to the Danish economy is thus relatively "cheap" from an energy perspective. This result is to be expected, as some industries are very resource-intensive, such as the plastics, glass and concrete industries.

For a given national economic objective, energy consumption can be reduced in two ways. Either by a more efficient use of energy in existing industries or by a shift in production to relatively low-energy-intensive industries.

The relatively large economic growth in the life science industry over the past decade means that a larger and larger share of Denmark's economic prosperity comes from the life science industry. From a resource perspective, a larger part of Denmark's economic activity is thus carried out with low energy intensity.

Energy intensity by industry, 2016



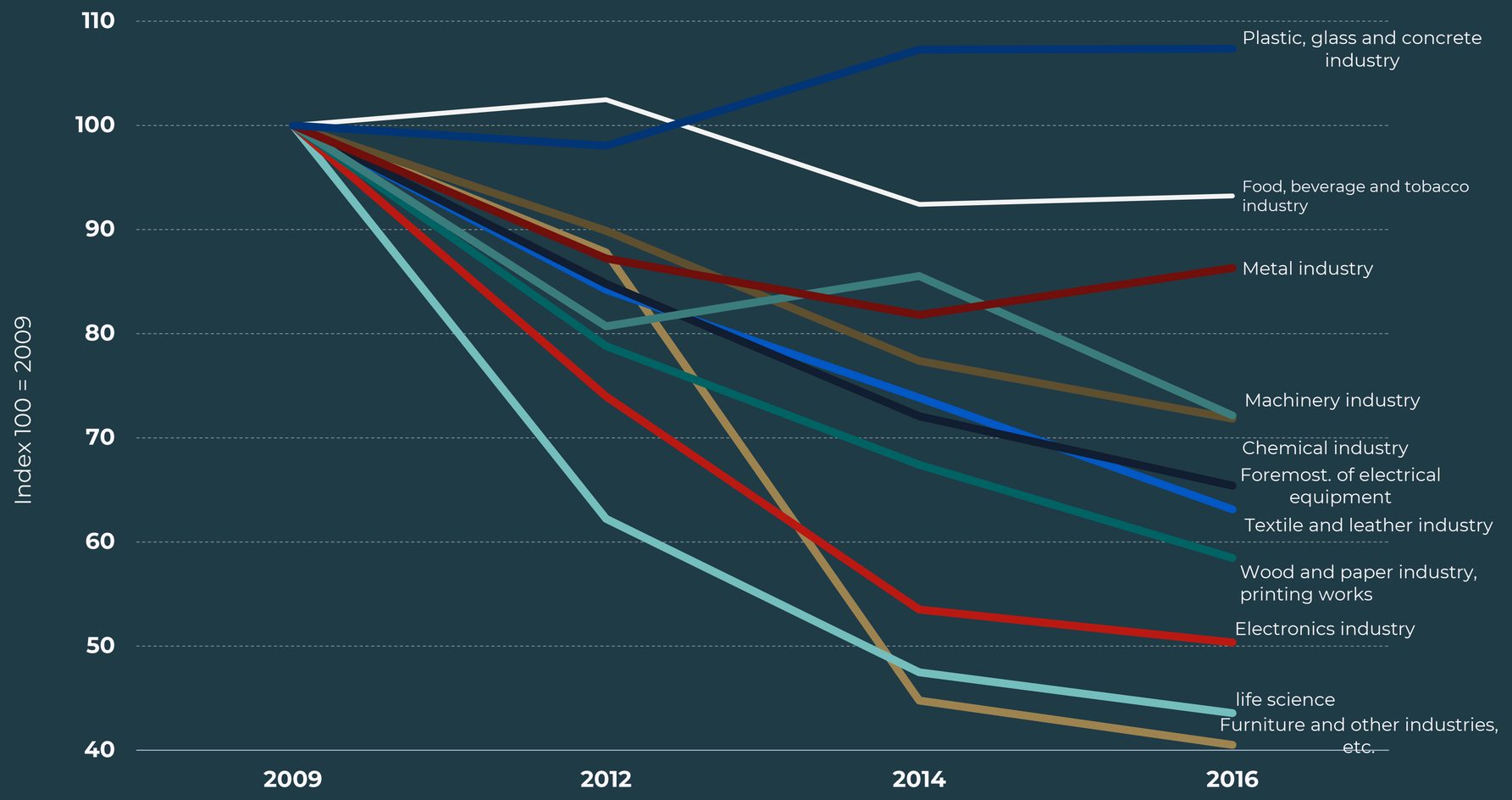
Source: DAMVAD Analytics based on Industry's Energy Consumption and Company Statistics from Statistics Denmark
Note: Energy intensity is defined here as energy consumption in relation to value added at a given production.
[1]Note that value added is calculated in current prices. The overall decrease in intensity should thus be seen in the context of an annua , of around 1.5% from 2009-2016.

Life science is at the forefront of energy efficiency

The decrease in energy intensity in the life science industry should be seen in the context that the vast majority of industries are gradually becoming more energy efficient due to new technologies and the like.

However, compared to a large number of other industries, the life science industry has improved the efficiency of its production relatively much during the period 2009-2016.

Energy intensity by industry, 2009 to 2016



Source: DAMVAD Analytics based on Industry's Energy Consumption and Company Statistics from Statistics Denmark
Note: Energy intensity is defined here as energy consumption in relation to value added at a given production.
[1]Note that value added is calculated in current prices. The overall decrease in intensity should thus be seen in the context of an annual inflation of around 1.5% from 2009-2016.

Emissions, energy and resource consumption among 10 large life science companies

In continuation of the above analysis results on the industry's general emissions and energy consumption, it is interesting to look at the development in the climate and resource footprint of some of the large life science companies which account for a large part of the total emissions in the life science industry.

Large companies must, cf. section 99 an of the Danish Financial Statements Act, supplement their management report with information regarding the company's work with the environment and climate. However, the Danish Financial Statements Act does not impose requirements for reporting actual levels or development, which is why only approx. half of the major life science companies report actual levels or developments for the climate/environmental impact in question (see table on next page)

The climate and resource footprint of 10 large life science companies

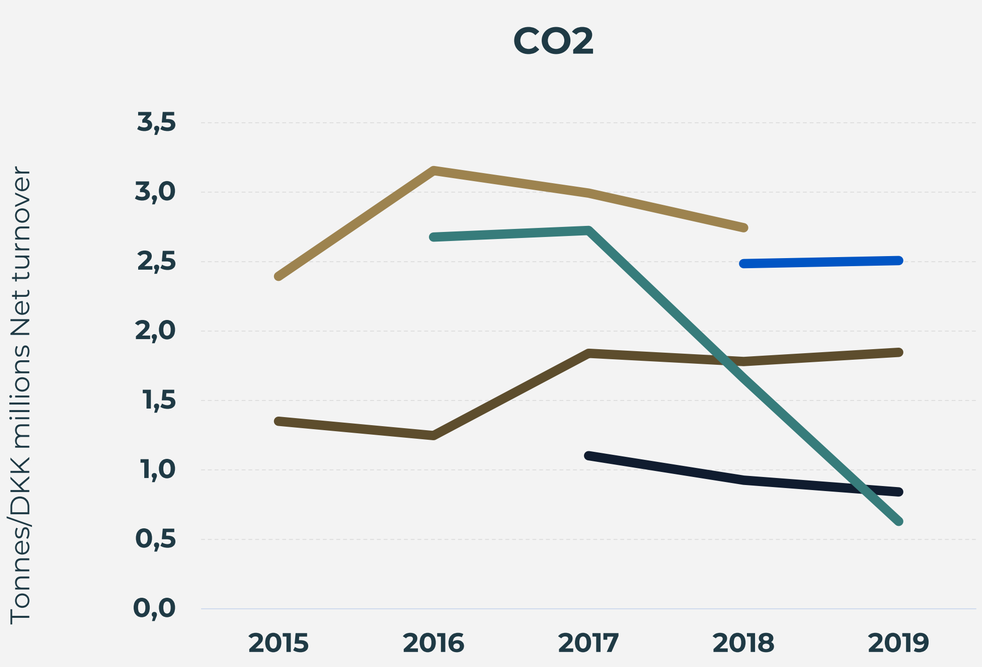
The table shows an overview of which variables are calculated in the largest life science companies' financial statements and CSR reports.

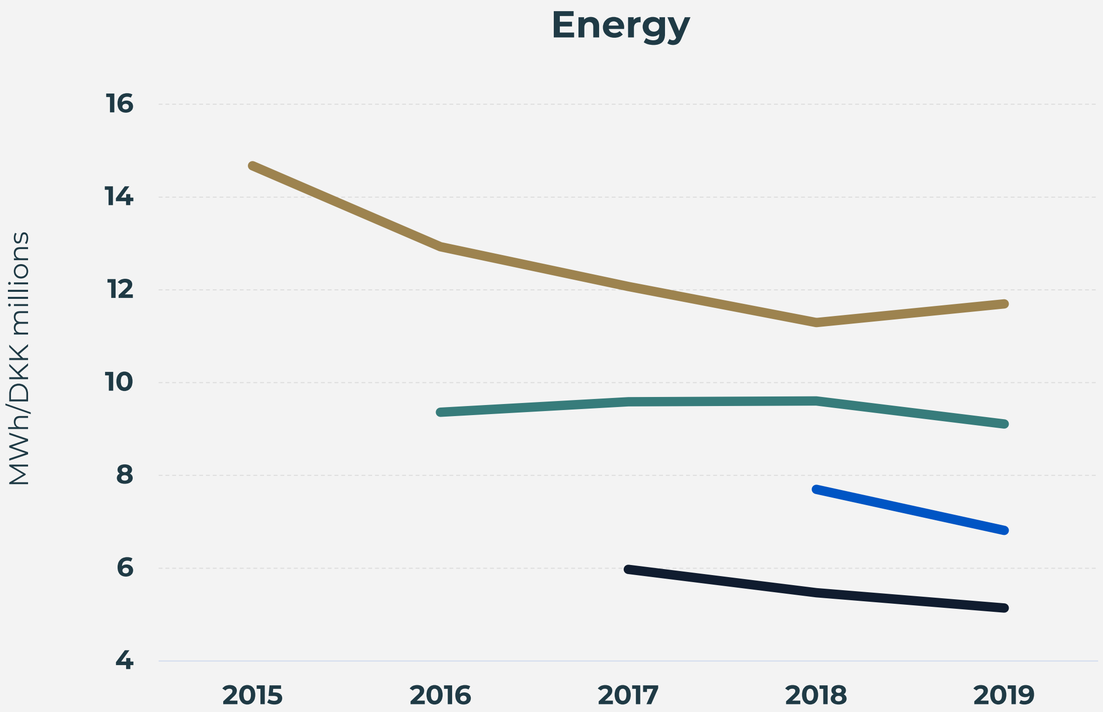
Note that the demarcation across companies may vary. Thus, it is not certain that two companies that both report CO2 will report a directly comparable figure.

The list is not exhaustive, and some companies thus report indicators in addition to those shown.

Company	Industry	CO2/GHG	Energy Of which renewable (right)		Waste	Water
NOVO NORDISK A/S	Pharmaceuticals & Medical	✓	✓	✓	✓	✓
H. LUNDBECK A/S	Pharmaceuticals	✓	✓	×	✓	✓
COLOPLAST A/S	Medico	✓	✓	✓	✓	✓
DEMANT A/S	Medico	✓	×	×	×	×
LEO PHARMA A/S	Pharmaceuticals	✓	✓	✓	✓	✓
NOMECO A/S1	Medico	✓	✓	×	✓	×
ORIFARM GROUP A/S	Pharmaceuticals	×	×	×	×	×
GENMAB A/S	Pharmaceuticals	×	×	×	×	×
T&W MEDICAL A/S	Medico	×	×	×	×	×
ABENA HOLDING A/S	Medico	×	×	×	×	×

The climate and resource footprint is generally declining for large life science companies





Novo Nordisk Lundbeck Demant Coloplast LEO Pharma

Source: Corporate financial statements and CSR reports
Note: The demarcation across companies may vary. Thus, it is not certain that two companies, both reporting CO2, report a directly comparable figure. Comparisons across companies must therefore be made with caution – this is especially true for comparisons of the absolute level. The exact delimitation can be found in the companies' accounts. For the greenhouse gas emission, the starting point is scope 1 + 2. Net turnover is deducted from the companies' consolidated accounts and calculated in current prices. Please note that Coloplast's financial year does not follow the calendar year but runs from the beginning of October to the end of September.

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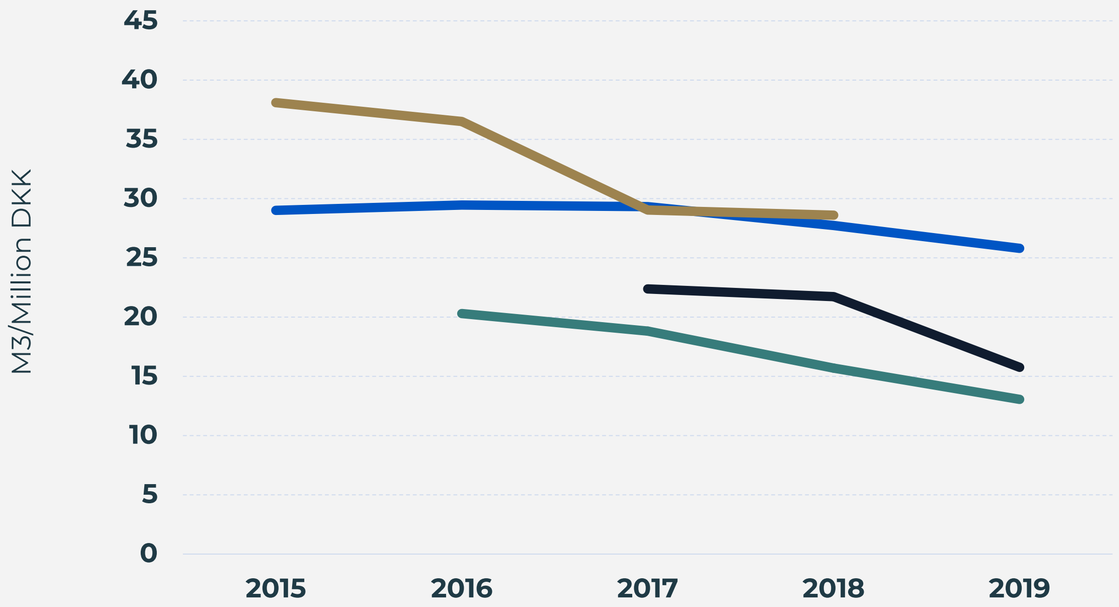
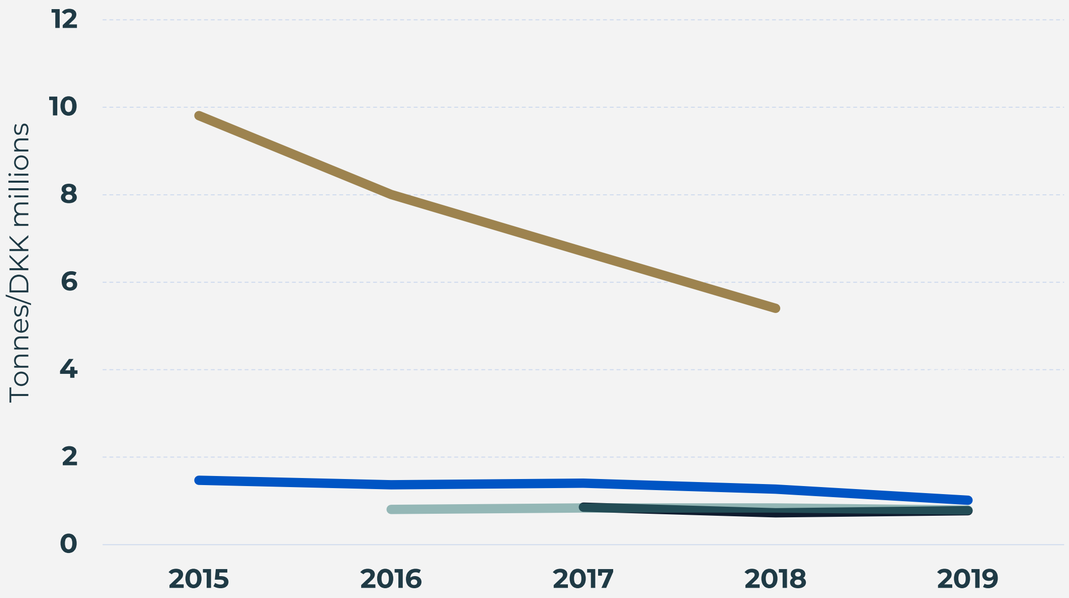
The climate and resource footprint is generally declining for large life science companies

Water consumption



Waste products



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Definition and method

Data sources for delimitation of life science companies

There are three sources for delimiting companies that work within life science

Product codes

The product codes are used to identify the life science companies that export life science products and that do not necessarily have the correct industrial classification code. However, many of these companies also export goods that are not life science and/or have a small total export. In order to avoid including companies that are not really life science companies, it is thus a condition that the life science export share must be greater than 50 per cent. In addition, it is stipulated that the total export in relation to turnover must be greater than 25 per cent, as the method is otherwise not robust. At the same time, all companies that are outside industry A-N are removed, i.e. all public companies. By collecting product codes, member lists and industrial classification codes, 1,518 life science companies are identified in 2017.

Industrial classification codes

The calculation of key figures for the life science industry includes all companies that are part of the 8 different industries (see next slide).

Member lists

A number of companies have been identified on the basis of membership lists from non-governmental organizations in life science and biotechnology

Connection between Company statistics and the national accounts

All financial key figures in the section on the life science industry in Denmark are based on company statistics. The company statistics are a "first-hand report" directly from the companies and therefore provide faster access to the figures than the accounting statistics on which the national accounts are based. The company statistics can generally be approximated to the national accounts, but this requires a number of corrections.

For example, the total value added of the private business sector, which is indicated in the company statistics, can be approximated to the gross value added (GVA) from the national accounts. However, a number of corrections are being made. Of these, the most important is the R&D correction, i.e. funds spent on own research and development, which are not counted as value added in the company statistics. The other corrections depend on the industry in question, but in the industry it includes, for example, software produced at own expense, production output for own consumption and fringe benefits.

In the calculation of the life science industry's value added, we must, as a minimum, add own research and development to the value added calculated in the company statistics. In addition, value is created abroad. The difference between GVA and gross domestic product (GDP) must be found in product taxes. If the product taxes are added to GVA, an indication of GDP is obtained.

Weighting of Life science companies

Figures for the life science industry can be compared internationally on 4 digit industry codes. In order to be able to compare internationally, companies with an emphasis on one are included in the industry they belong to. However, Novo Nordisk is an exception. They are mainly part of 212000, but also partly in 325000, which is their bee industry.
Companies located in branches 464610 and 464620 are indistinguishable from each other internationally. They are therefore included with a total weight of 1 and are allocated respectively. Medico as well as Pharmaceutical and biotech pba. their sales.
Companies outside the 8 industries are bounded by pba. list of members and product codes, and is assigned, respectively, a medico and a medicinal product weight, which assumes a value between 0 and 1

$$\text{Medico weight} = \frac{Export\ of\ medico}{Total\ export}$$

$$\text{Pharmaceutical weight} = \frac{Export\ of\ pharmaceutical\ and\ biotech}{Total\ export}$$

Industrial classification codes in the life science industry

	DB07 industrial classification code	Description of industry
Medico	26.60.10	Manufacture of hearing aids and related components
	26.60.90	Manufacture of irradiation equipment and electro-medical and electrotherapeutic equipment
	32.50.00	Manufacture of medical and dental instruments and related equipment
	46.46.20	Wholesale trade with medical and hospital products
Pharmaceuticals and biotech	21.10.00	Production of pharmaceutical raw materials
	21.20.00	Production of pharmaceutical preparations
	46.46.10	Wholesale trade with medical products and nursing requisites
	72.11.00	Research and experimental development in biotechnology