FREMTIDENS BÆREDYGTIGE PRODUKTION

DANISH INDUSTRY FOUNDATION

ATV Danish Academy of Technical Sciences

POSITION STATEMENT

A call for standardization of statistics to promote national level comparison of the green transition of Europe's manufacturing industry *– and its competitiveness*

Position Statement to be shared with technical academies in the Euro-CASE (European Council of Academies of Applied Sciences, Technologies, and Engineering) network to solicit the interest regarding a joint effort concerning standardization of statistics related to the manufacturing industry and green transition.

The statement is formulated in connection with the project Future of Sustainable Manufacturing (2020-22) financed by the Danish Industry Foundation.

Background

The European Union has launched several high-level initiatives designed to support the green transition of the region, i.e. the European Green Deal, the Taxonomy for Sustainable Finance, the Circular Economy Action Plan, as well as initiatives that are product specific, e.g. EcoDesign and more recently, the Digital Product Passport. Such initiatives are designed, among other things, to help European companies decoupling economic growth from e.g. CO_2 emissions or waste generation.

Many companies in Denmark are working actively on transition towards a more sustainable production. There are many initiatives to support these efforts. Some initiatives are driven by public stakeholders and funded by the European Union, e.g. Green Circular Transition and Green SME.

Indicators for the manufacturing industry's green transition

In collaboration with the Danish Industry Foundation, the Danish Academy of Technical Sciences has worked actively to promote the green transition of Denmark's manufacturing industry. A key component in these efforts has been to develop a baseline[1] that uses data from the national bureau of statistics, Statistics Denmark, to calculate the industry's performance in five areas that are central to developing a more sustainable manufacturing sector. The project defines these five areas as effect indicators and include: resource, water and energy consumption, CO_2 emission and waste generation. In addition, the project identifies the productivity of the five effect indicators.[2]

1
The 2021 and 2022 baseline can be downloaded here: https://atv.dk/baseline. The 2021 version includes data from 2010-2018, whereas the 2022 version includes data from 2012-2019.

2
Productivity is calculated by dividing Grpss Value Added by total consumption / emissions / generation and expresses the value produced in relation to consumption / emissions / generation. High productivity indicates a positive development.

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From an environmental perspective, the baseline has defined metrics and a benchmark against which Danish companies can compare performance and productivity. The baseline e.g. shows significant variations in waste generation and waste productivity within the two industrial sectors *Manufacture of plastics, glass and concrete* and *Manufacture of chemicals*. From 2012 to 2019, generation of waste from Manufacture of chemicals has increased with more than 200 % whereas the industrial sector Manufacture of plastics, glass and concrete has reduced waste generation by approximately 40 % during the same time period.

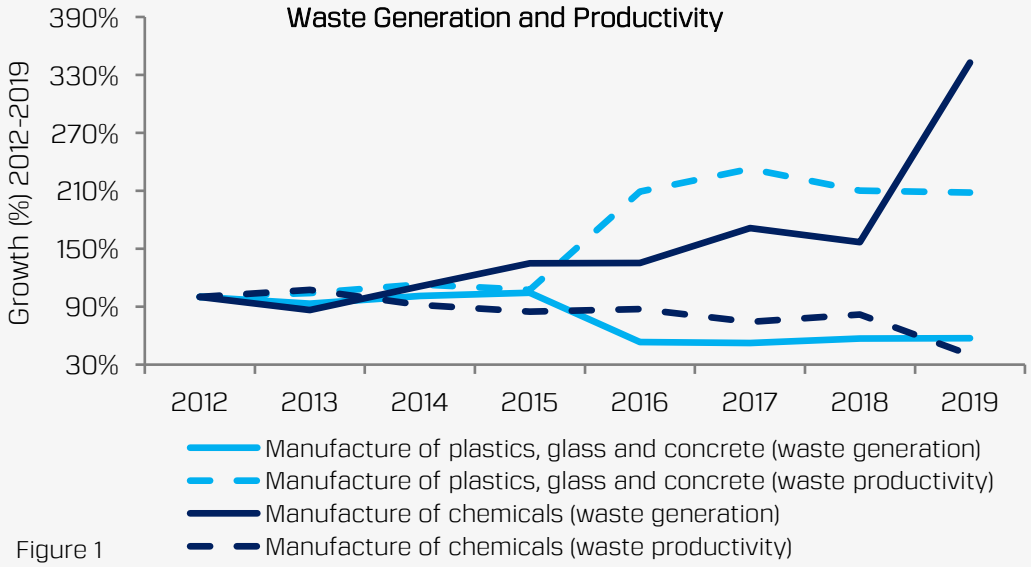

Figure 1

From 2012 to 2019, two thirds of the industrial sectors managed to reduce water consumption and to increase water productivity. The industrial sector Manufacture of chemicals is among the sectors with the highest increasing water productivity whereas decreasing water productivity is seen in Manufacture of plastics, glass and concrete.

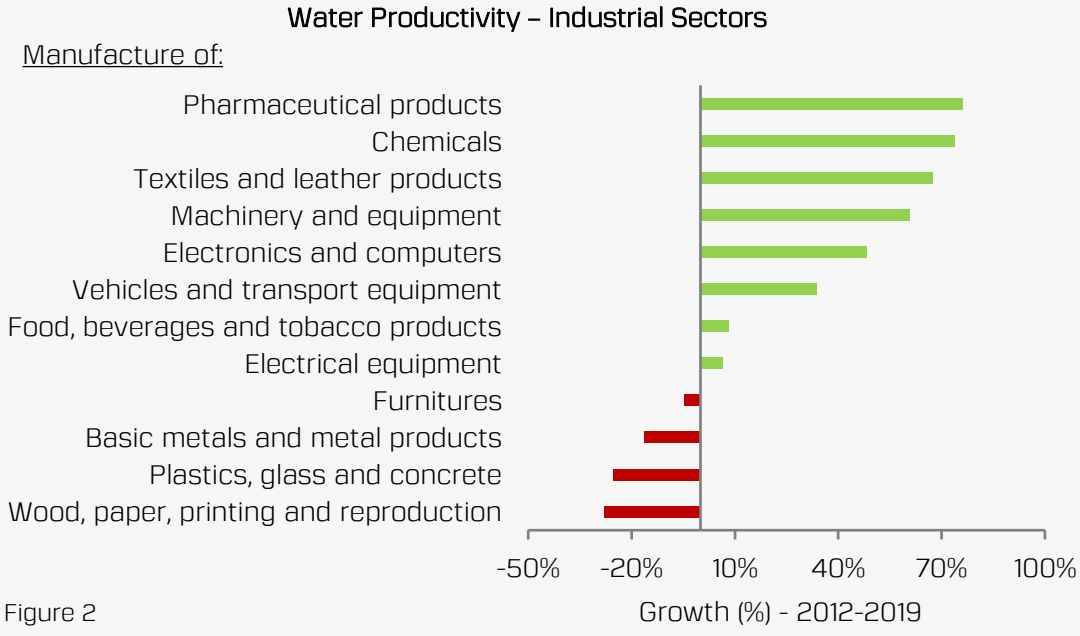

Figure 2

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The baseline, however, does not reveal how the Danish manufacturing industry's transition compares to its peers in Europe. Therefore, in 2022, ATV commissioned a pilot study in the form of an international benchmark analysis which compared the performance of the Danish manufacturing industry with the performance of the manufacturing industry in four European countries: Germany, Poland, Sweden and the Netherlands. The indicators were the same as in the original baseline, i.e. consumption of water and energy, CO_2 emissions and waste generation (data on resource consumption was not available). The statistical data was collected via EuroStat and OECD.

Latest available data on energy and water consumption, CO_2 emission and waste generation in absolute numbers is presented for the manufacturing industry in Denmark, Germany, Poland, Sweden and the Netherlands (table 1).

Denmark	Germany	Poland	Sweden	The Netherlands
Energy consumption (2018) *(Thousand tonnes of oil equivalents)*				
2319 (18%)	57090 (28 %)	16328 (51 %)	11013 (27 %)	13465 (19 %)
Water consumption (2018) *(Million cubic metres)*				
101 (10 %)	4433* (20 %)	666 (7 %)	1782** (14 %)	3315 (27 %)
CO2 emission (2018) *(Million tonnes of CO2 eqivalents)*				
6 (15 %)	161 (22 %)	67 (18 %)	13 (29 %)	46 (29 %)
Waste generation (2018) *(Million tonnes)*				
1 (5 %)	57 (14 %)	30 (17 %)	5 (4 %)	14 (10 %)

Table 1: Latest available data in absolute numbers on energy and water consumption CO_2 emission and waste generation. *Water consumption data from Germany only available from 2010 to 2016. **Water consumption data from Sweden only available from 2010 to 2015. Numbers in paranthesis indicate industrial percentage of total energy and water consumption, CO_2 emission and waste generation.

Figure 3 presents growth (%) in energy and water consumption, CO_2 emission and waste generation. In general, decreasing consumption, emission and generation is seen across the five countries with Poland as the exception. However, the productivity within energy and water consumption and CO_2 emission is seen among all five presented countries (figure 4).

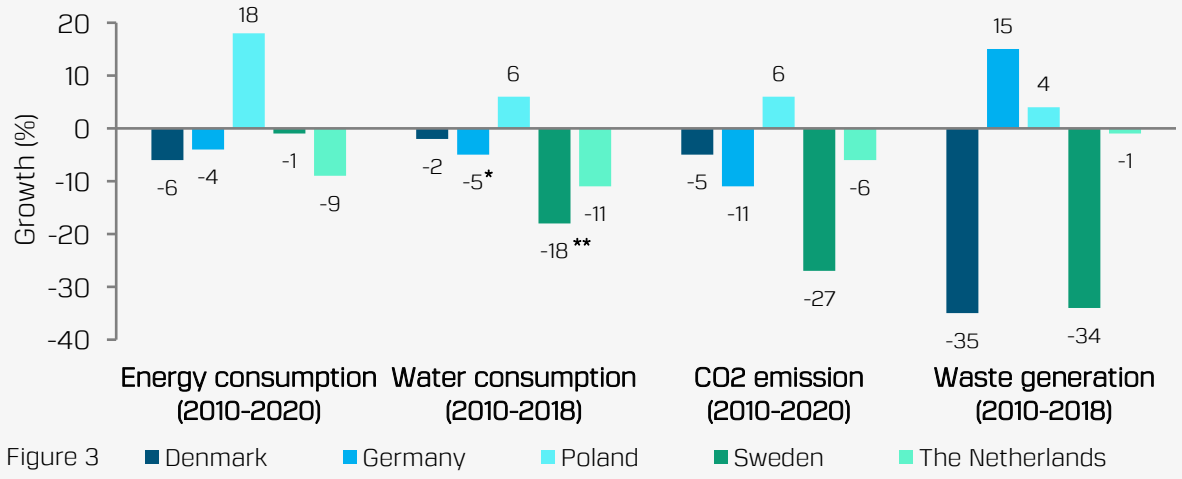

Figure 3

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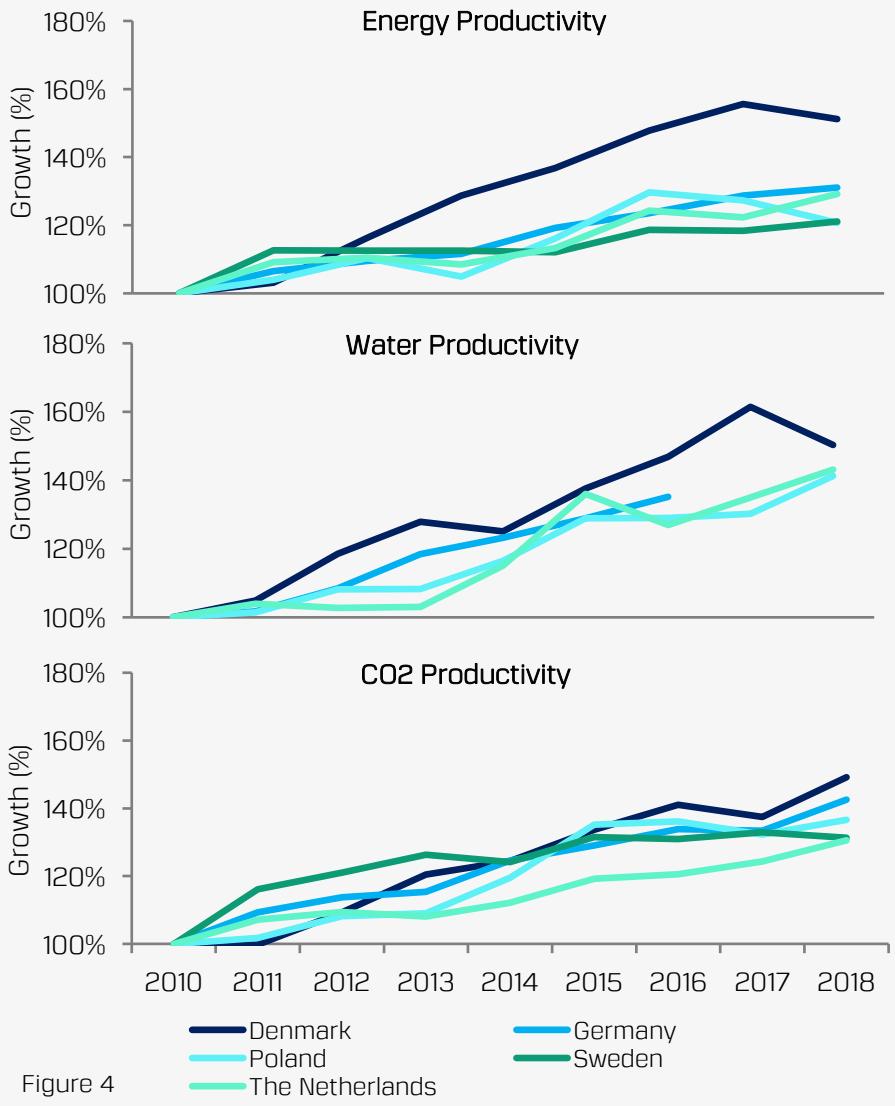

Figure 4

In Denmark, the increase in CO_2 productivity was nearly 50 %, the highest increase among the five countries. Also, data shows that energy and water productivity[3] is higher in Denmark than in Germany, Poland, Sweden and the Netherlands. High productivity rates in Denmark are not exclusively due to the Danish manufacturing industry being more competent at reducing energy and water consumption and CO_2 emissions compared to other countries. There are significant differences in the industrial composition of the five countries, and explicitly the industrial composition has an impact on consumption / emission / generation and productivity. The Danish manufacturing industry has outsourced many industries with high CO_2 emission rates. Additionally, the Danish manufacturing industry has positioned itself in parts of the value chain with high value creation and relocated industries with low productivity. However, due to varying industrial compositions in the five presentede countries and in varying data sampling methods this one-to one comparison of data can not be assumed reprensative.

3
As data on waste generation is only updated every second year the waste productivity is not presented.

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Standardization of statistics to support the green transition in Europe

The pilot study showed that data sources related to industry performance and sustainability are scarce but under development across countries.

Aggregated data

Aggregated data for the manufacturing industry on a country level was available for energy consumption and CO_2 emission (period: 2010-2020), water consumption (period: 2010-2018) and waste generation (period: 2010-2018. Data was not available for resource use.

We found that for certain indicators (CO_2 emission and waste generation) data is available from all four countries for specific sectors, whereas for other indicators (energy and water consumption) only the aggregated data is available.

The data sets from Statistics Denmark and the data sets from EuroStat and OECD are not directly comparable since EuroStat and OECD harmonizes data across the countries.

Sector specific data

It is problematic that data is not available for individual sectors since the industry composition of different countries in the EU is very different. For instance, in Denmark, the pharmaceutical industry's turnover makes up 16 % of the industry's total turnover. Whereas in Germany, the manufacture of pharmaceuticals only account for 5 %. In other words, given the existing data regime, it is impossible to compare the water and energy productivity of the Manufacture of pharmaceutical sector in Denmark and Germany. In general, the composition of a country's industry has great impact on its performance vis-à-vis the indicators. Hence, the aggregated data is likely to cloud good or bad performance of sectors that make up a considerable portion of the total industry. At the same time, there are good arguments for pooling similar industries into one group. But again, a standardized breakdown is necessary for the purpose of comparing performance across borders.

Supply chains

Another problematic finding relates to supply chains. This issue was identified in the data from Statistics Denmark as well as in the data from EuroStat and OECD. For instance, when looking at energy consumption, it is not clear what kind of measurements are included: Is it the direct consumption (scope 1), indirect consumption (scope 2), or does it also include the energy consumption of subsuppliers (scope 3)? If suppliers are domestic, they should be included in the aggregated data. However, in the current regime there are not data-collecting mechanisms to include non-domestic suppliers.

Common metrics

The pilot study points towards a lack of standardized data collection in Europe, i.e. that companies across Europe are met with different requirements from their national statistical bureaus.

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Common metrics

The pilot study points towards a lack of standardized data collection in Europe, i.e. that companies across Europe are met with different requirements from their national statistical bureaus. This influences negatively on the quality of the possibilities for comparative studies as well as the ability of decision makers in the individual countries to assess the performance of the manufacturing industry in specific countries.

Link between initiatives and indicators

Finally, a major shortcoming in the existing data regime is the lack of data on initiatives taken by companies or specific sectors to e.g. decrease the use of virgin resources: How does insourcing or outsourcing in one sector effect productivity, how do taxes on water, energy, and waste affect productivity etc. That is to say, it is not possible, on aggregated level, to evaluate the effectiveness of specific initiatives. Which means that policy advice or management support cannot, in this case, be data based. By extension, this also means that it is difficult to set realistic targets for the regulators and for the industry itself.

Commonalities with acatech analysis

Our conclusions, align with a recent analysis by acatech which looked specifically at data availability related to the development of circular economy. This report concluded, among other things, that:[4]

- The fact that there are no standardized metrics for data and data collection in Europe regarding industry's circular economy initiatives, impedes our ability to evaluate initiatives and provide data-based input to policy makers
- Linkages of progress towards a circular economy at national level and at company level are not visible. Therefore, the report recommends that enabling activities should be measured and a standardized system for collecting data from companies should be developed, including data from the whole supply chain
- EU can draw inspiration from the implementation of the Taxonomy for Sustainable Finance with respect to the standardized data collecting processes, including ways to drive a common definition of circular economy initiatives
- EU must define measurable targets that are supported by monitoring and a legal framework.

4 MAKING THE CIRCULAR ECONOMY COUNT, Kick Marlene, Kadner Susanne, Greiff Kathrin, Jarchow Svenja, Stuchtey Martin R., Weber Thomas, and Kobus Joern. acatech/SYSTEMIQ, München/London 2021.

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Indicators = a stepping stone towards circular economy

A fully implemented circular economy seems for the time being as the best bet in terms of reaching the goal of decoupling economic growth from resource use. However, it is also a multi-year process to develop such an economy.

In the Danish context, we view the five sustainability indicators (resource , water , and energy consumption, CO_2 emissions and waste generation) as an important stepping stone that can help develop the processes that eventually will be a cornerstone in measuring companies' and countries' performance in the circular economy.

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INFO BOX

Insights from Stuttgart

In September 2022, ATV and Innovation Centre Denmark in Munich organized a study trip to Stuttgart to survey the sustainability initiatives among small and medium sized companies in the cradle of Germany's manufacturing industry.

The companies that we visited are all global leaders in their field and part of the car industry's supply chains. Among these companies, the major concern was competitiveness which, among other things, translated into a focus on energy efficiency, limiting use of resources, and the unnecessary generation of waste. Sustainability as such was mainly associated with the reduction of CO_2 emissions which was obviously a topic that attracted both investments, new technologies, and a range of policy initiatives. And sustainability in a more general sense is only starting to emerge as a strategic priority.

The local government and the various offices under its administration, e.g. clusters, were active in supporting the transformation of the manufacturing industry. However, compared to similar organizations in Denmark, industry played a more prominent role in setting the agenda. Hence, we also found that companies and clusters were more active in guiding the policy level on sustainability initiatives than vice-versa.

In general, a key observation from the trip was indeed that even though Denmark and Germany are neighbouring countries, our companies and government institutions speak very differently about sustainability and what is – and should be – included in the sustainability agenda. This observation underlines the need for a common statistical framework in Europe in order to establish a common language among the member countries, our companies, and politicians, as well as to improve the potential for comparing sustainability performance across country borders.

Finally, an important observation that Danish companies need to take seriously: The companies we visited experienced a shift in documentation requirements from financial institutions and are being pushed by these to produce documentation regarding their performance vis-à-vis the EU Taxonomy for Sustainable Finance. This trend is likely to continue and will result in two things: Firstly, the German SMEs and multinationals will quickly adjust to and align with new sustainability requirements generated by the taxonomy. Secondly, Danish companies who are part of German supply chains will be met with new requirements as their performance will be factored into the required documentation of their German customers – most likely, existing documentation procedures in many Danish sub-suppliers will not suffice and these companies thus have a major adaption task at their hands.