

GREEN PUBLIC PROCUREMENT FROM THE CONTRACTOR'S PERSPECTIVE

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Purpose: Governments in many countries are trying to prevent climate change. One way of doing this is through green public procurement that consists of procuring goods, services and works with a reduced environmental impact during their life cycle compared to goods, services and works with an identical purpose that might otherwise have been procured. So the paper aims to examine private companies' readiness to provide green goods and services in response to demands of green public procurement. This may encourage public entities to wider use of green public procurement because they may be afraid of an inadequate amount of companies that can meet the procurement criteria. The paper provides tips on how to organize the work of a public institution to make green public procurement more widespread.

Design/methodology/approach: The methods used in this study were literature analysis, statistical survey, static analysis and case study. By means of a statistical survey and analysis, the relationship between the knowledge of employees of a given company regarding the knowledge of concepts related to green public procurement and the type of position was demonstrated. On the other hand, with the help of a case study, it was shown how an existing public procurement can easily be transformed into a green public procurement.

Findings: In order to achieve sustainable outcomes, it is necessary to introduce internal regulations of public organisations relating to the integration of environmental considerations into tendering procedures. Public organisations should realise how easy it is to turn a public procurement into a green public procurement and that companies are already ready to do it. Almost any company can meet the environmental requirements to participate in green public procurement, the criteria depend on the ingenuity of the public organisations' staff. The main difficulties in including environmental aspects in tendering procedures include insufficient knowledge and experience of the contracting authorities in their practical application.

Originality/value: The paper discusses the role of green public procurement, as well as how to manage a public organisation, what to do to make green public procurement widely used. Relevant knowledge of public employees, political will, as well as the fashion for green public procurement are important in the introduction of the above mentioned procurement. The paper also focuses on the private company's point of view.

Keywords: carbon footprint, public procurement, green public procurement, climate change.

Category of the paper: research paper.

1. Introduction

Human activity is the cause of the climatic changes taking place on the globe, leading, among other things, to the melting of glaciers in Greenland and Antarctica. This is due to an increase in the production of electricity, which is necessary to improve living conditions. This increase has been particularly evident since the end of the 20th century. However, this is not only a positive phenomenon, its negative effect is the increase in greenhouse gas emissions (e.g. CO₂ by 68%), resulting from the burning of fossil fuels to produce electricity.

Thanks to the collaboration of scientists from around the world with the Intergovernmental Panel on Climate Change (IPCC), the issue of climate change has been publicised. A carbon footprint has been introduced as a tool to guide appropriate emission reductions and facilitate understanding of the risks of global warming (Climate Change: The Physical Science Basis, 2021). Governments in many countries are now trying to prevent climate change by introducing green changes that make the functioning of society greener.

There are many ways to make green changes in society. One of these is green public procurement (GPP). With these, any public entity can aim to reduce its carbon footprint. Among public institutions, local and regional governments in particular must be part of an immediate and sustainable reduction in greenhouse gas emissions, as they are the ones performing the bulk of public tasks.

The basic concept of green public procurement is to integrate environmental criteria in public procurement of products and services. Across the world, green procurement is a market liberator that allows more environmentally friendly goods and services to come to market (Cheng et al., 2018). Green public procurement can be seen as a catalyst for change, making contractors interested in finding and developing innovative environmental technologies (Chrisidu-Budnik, 2022). Most of the literature focuses on the perspective of the contracting authority. This work presents the contractor's perspective.

The main hypothesis of the study is the assumption that most contractors can fulfill the requirements to participate in GPP and that all employees are familiar with the concept of green public procurement.

2. Human-induced climate change

To date, human activity has led to a temperature rise of 1.1°C. Studies covering the period between 1850 and 1990 lead to this conclusion. In 2021, the Intergovernmental Panel on Climate Change (IPCC) published a new report 'Climate Change 2021: The Physical Science Basis', which contains the state of the art on climate change. It has been endorsed by

195 national governments and presents rapid human-induced changes. The key findings of the report are that CO₂ concentrations in the atmosphere are the highest in 2 million years, sea level rise is the fastest in 3,000 years and Arctic sea ice is the lowest in at least 1,000 years. This entails extreme weather events such as forest fires in North America and Southern Europe, extreme flooding in China and Western Europe and devastating tropical cyclones on the Indian and Atlantic coasts (Vigran, 2021).

According to various climate models, the Earth's temperature will continue to rise. Each of the scenarios studied assumes a further increase of at least 1.5°C, and this will happen by 2040 at the latest, the most optimistic scenario. In the most pessimistic one, if no systemic changes are made, the temperature could rise by as much as 4.4°C by the end of the century. At present, however, a temperature rise of 2.7°C is the most likely scenario, thanks to the regulations and greenhouse gas reductions being introduced (Vigran, 2021).

An important step towards reducing emissions is to quantify the amount of greenhouse gas emissions caused by different human activities. This is done through the carbon footprint, introduced as a tool to guide appropriate emission reductions and verifications to facilitate understanding of global warming risks (Awanthia, Navaratnea, 2018). According to the simplest definition, the carbon footprint is the total amount of CO₂ and other greenhouse gases (e.g. nitrous oxide, methane) that are emitted by various products and processes, resulting from the entire life cycle of a product; this includes storage and disposal. It is a measurable indicator that can be used for a specific company, organisation, product, service, process, region or country. Calculating an organisation's carbon footprint can be an effective tool for continuous energy and environmental management (Kijewska, 2017).

Over 90% of all greenhouse gas emissions come from sectors that are central to our daily functioning. Major emitters include industries such as agriculture, heavy industry, construction, transport and energy. Energy was responsible for 77.01% of GHG emissions, agriculture for 10.55%, industrial processes and product use for 9.10% and waste management for 3.32% (Europarl.europa, 2021). It is therefore very important to adopt practices that reduce greenhouse gas emissions. In the construction industry, the use of non-conventional and environmentally friendly materials and technologies is becoming increasingly popular, which will enable the reduction of material and energy consumption in buildings (Geneidy et al., 2021). In the energy sector, the use of renewable energies such as hydropower, wind and solar energy, which can serve as an alternative to fossil fuels, is increasingly developing (Esquivel-Patiño, Nápoles-Rivera, 2021). In transport, the easiest way to reduce emissions is to use public transport. Thanks to the awareness of an increasing number of citizens and through growing concerns about pollution, more and more people are paying attention to how they can reduce their carbon footprint themselves (Europarl.europa, 2021).

3. Green public procurement

Procurement spending averages between 13 and 20 per cent of gross domestic product (GDP) in most countries, equivalent to an annual global expenditure of around US\$9.5 trillion (The World Bank, 2020). Public procurement is defined as the acquisition of goods, services and works by government institutions and state-owned enterprises from private sector suppliers. Public procurement can also be done as green public procurement. This consists in giving preference to goods, services and works whose environmental impact during their life cycle is limited compared to goods, services and works with an identical purpose that could have been procured through other means. The most important aspect in green public procurement is the compliance of contractors and subcontractors with environmental law. Through the implementation of such procurements, mistakes that were made earlier can be rectified and a better future life can be pursued for the entire population (Johnson, Klassenof, 2022). It is therefore not surprising to conclude that green procurement is a demand-side policy tool that can contribute to reducing environmental impact and a circular economy (Lindfors, Ammenberg, 2021).

Green procurement has been implemented worldwide for more than a decade and is oriented towards green production and consumption. As early as 2004, the Chinese government acknowledged that green procurement should foster energy conservation, environmental protection and awareness of the resource crisis throughout society (Wang et al., 2021). Green procurement typically provides public organisations with financial savings, especially when considering the life-cycle costs of the products or services procured, rather than considering only the acquisition price. This is because the acquisition price is only one part of the cost in the whole procurement and ownership process. Life-cycle costing takes into account all costs that occur during the life cycle, such as: operating costs, including fuel and water consumption, as well as maintenance and all costs associated with the operation (supplies, insurance, etc.), end-of-life costs, such as the cost of disposal or decommissioning. In this way, it is possible to purchase something more expensively, but then in the overall calculation it turns out to have been the cheaper choice.

For example, when purchasing green buses, a life-cycle costing model can be used, taking into account the purchase price, operating and maintenance costs and fuel consumption and costs. The total procurement cost may be higher than the cost of purchasing non-environmentally friendly buses, but this will be offset by lower operating costs (Vidal, Sánchez-Pantoj, 2019).

There are also obstacles to the implementation of green procurement. Information on the calculation of the life-cycle cost of products is not widely known, the same applies to the cost of environmentally friendly products/services. There is low awareness of the benefits of environmentally friendly products and services. There is a lack of adequate political support for

the implementation and promotion of green procurement, which limits the availability of resources (e.g. too little training), and there is a lack of coordinated exchange of best practices and information between regional and local institutions. States should focus on promoting and supporting green public procurement as much as possible. The initiative of public authorities is crucial for the start and continuation of the green economy (Ekologiczne zakupy, 2016).

4. The role of public organisations

Public organisations can make a significant contribution to reducing greenhouse gas emissions, as well as to protecting the environment. Part of the activity of public organisations is the procurement of goods and services. The purchasing power of public authorities makes green public procurement an important tool in the fight to achieve sustainable development. In many countries, green public procurement is considered one of the most important contributors to green consumption. As a direct result of green procurement, public authorities can spend less on energy, pollute less and create a green image for the government. In this way, public authorities can play a leading role in the transition from traditional to green consumption. As the most authoritative consumer in the country, a public authority can effectively serve as an example and guide for its followers - individual consumers (Wang et al., 2021).

Green public procurement is a driver of innovation. They stimulate industry to create green products and services. For example, timber procurement in Europe has stimulated the consumption and production of certified timber. In addition, environmental criteria and requirements can also promote the circular economy and related business models. In industries where public procurement has a large market share, such as construction, medical services or transport, it is a major source of innovation through the creation of green products and services (Nissinen et al., 2009).

In Poland, purchases by public entities are regulated by the Act of 11 September 2019 - Public Procurement Law (Journal of Laws of 2020, item 1710 as amended). This act makes it possible to take care of environmental protection by introducing sustainable public procurement, where the award of a contract can be made subject to environmental criteria.

Green procurement requires collaboration between different departments and staff within an organisation. To make green procurement more common and easier to use, it is necessary to: identify an appropriate scope of procurement activities, include targets and timeframes, and include a mechanism to adequately monitor the performance of the procurement. The support of senior people is also considered an important factor in the implementation of green procurement (Ekologiczne zakupy, 2016).

5. Research methods

The research covered two interrelated topics. The first part focused on conducting a survey among the employees of a cleaning company. Based on the results, a static analysis was carried out. The static survey was conducted among 30 employees of the company. The main aim of the survey was to compare the employees knowledge of green procurement according to their job position. The study presented here used a survey questionnaire as a research tool. The questionnaire was anonymous and, for a complete characterisation of the situation, information on the sociological characteristics of the respondents was included. The survey was followed by a statistical test. For this study, the choice was Pearson's chi-square χ test. The chi-square test can be used as a chi-square test of one variable or a concordance test, used in practice to check the equality of groups and to estimate whether the distribution of the study variable differs from the theoretical distribution we indicated. The test can also be used as a chi-square test of two variables or an independence test used to examine the existence of a relationship between two variables (Mider, Marcinkowska, 2013).

The χ^2 test is particularly useful in studies where two variables are measured on nominal scales. A nominal scale is one where its values represent categories, with no internal ranking, i.e. it is not possible to determine which of the cases is, for example, greater, better, more important than the other (Słowińska, 2019). The calculation procedure of the chi-square test consists of four steps. The first stage consists in presenting the observed numbers in the form of a contingency table in which the respondents answers are counted for particular categories of variables. The second step is to create a table with expected numbers. A table analogous to the table with observed numbers is created. Expected counts are calculated assuming that the variables are independent. The third step is to calculate the value of the χ^2 statistic. The last step is to compare the calculated value of the χ^2 statistic with the critical value χ_{α}^2 . Critical values are read from the tables of chi-square distribution for the assumed level of significance ($\alpha = 0.05$) and appropriate degrees of freedom (Aczel, 2000). Based on the χ^2 and χ_{α}^2 statistic values, hypotheses are verified. The null hypothesis - the tested variables are independent and the alternative hypothesis - the tested variables are dependent. If the value of χ^2 is lower than the critical value, there are no grounds for rejecting the null hypothesis i.e. the independence of the variables is assumed, while when the value of χ^2 is greater than the critical value, the null hypothesis should be rejected, which allows us to conclude that the tested variables are dependent (Łapczyński, 2015). The significance level was $p = 0.05$, indicating also statistically significant results for the levels $p = 0.01$ and $p = 0.001$, p-values indicating a statistically significant result are in bold.

The second part of the survey concerned the analysis of the surveyed company's participation in a public tender. The analysis focused on how public procurement can easily be transformed into green public procurement, which can then be used to formulate rules for managing public procurement to make it greener. A case study method based on public procurement tender documents was used. Document-based case analysis is the dominant method in scientific analysis, the documents used in the study can be external information such as reports and minutes, as well as coming from inside the organisation, i.e. balance sheets, regulations, payroll, etc. (Pizło, 2009).

6. Results

Based on the survey, it is possible to find out how many people are familiar with the term green procurement. Out of the 30 people surveyed, almost 70% are familiar with the term, that is 21 employees, of these people 13 are office staff and eight are non-office staff (Table 1). The objective of the survey was to compare the knowledge of employees according to the type of position. The research group in this study was the group working outside the office, as it is mainly these employees who most often do not have a say in the decisions made regarding participation in a new project. Also, they are not involved in the daily conversations of the employees, so they have less access to information exchange than office workers. Those working outside the office are also more likely to be uninterested in climate change, according to the results. Awareness of environmental protection and related concepts is higher in the office-based group, as these employees are often more educated and have more knowledge about climate change, which is occurring at a very fast pace.

Table 1.

Results of the statistical test for the relationship between education, interest in climate change, care for the environment, knowledge of the concepts of sustainable development, public procurement and green public procurement - the place of employment

Variable	Parameter	Total (N = 30)	Office's workers (N = 13)	Employees working outside the office (N = 17)	p-value
Education	Primary education	3,33% (N = 1)	0% (N = 0)	5,88% (N = 1)	0,0057
	Vocational education	13,33% (N = 4)	0% (N = 0)	23,53% (N = 4)	
	Secondary education	16,67% (N = 5)	0% (N = 0)	29,41% (N = 5)	
	Higher education	66,67% (N = 20)	100% (N = 13)	41,18% (N = 7)	

Cont. table 1.

Interest in climate change	Definitely yes	36,67% (N = 11)	38,46% (N = 5)	35,29% (N = 6)	0,0295
	Rather yes	20,00% (N = 6)	23,08% (N = 3)	17,65% (N = 3)	
	I don't know	13,33% (N = 4)	30,77% (N = 4)	0,00% (N = 0)	
	I don't think so	23,33% (N = 7)	0,00% (N = 0)	41,18% (N = 7)	
	Definitely not	6,67% (N = 2)	7,69% (N = 1)	5,88% (N=1)	
Care for the environment	Definitely yes	40% (N = 12)	46,15% (N = 6)	35,29% (N=6)	0,4272
	Rather yes	30% (N = 9)	30,77% (N = 4)	29,41% (N=5)	
	I don't know	10% (N = 3)	0% (N = 0)	17,65% (N=3)	
	I don't think so	16,67% (N = 5)	23,08% (N = 3)	11,77% (N=2)	
	Definitely not	3,33% (N = 1)	0% (N = 0)	5,88% (N=1)	
Knowledge of the concepts of sustainable development	Definitely yes	40% (N = 12)	69,23% (N = 9)	17,65% (N=3)	0,0413
	Rather yes	26,67% (N = 8)	23,08% (N = 3)	29,414% (N=5)	
	I don't know	16,67% (N = 5)	7,69% (N = 1)	23,53% (N=4)	
	I don't think so	13,33% (N = 4)	0% (N = 0)	23,53% (N=4)	
	Definitely not	3,33% (N = 1)	0% (N = 0)	5,88% (N=1)	
Knowledge of the concepts of public procurement	Definitely yes	40% (N = 12)	69,23% (N = 9)	17,65% (N=3)	0,0332
	Rather yes	36,67% (N = 11)	30,77% (N = 4)	41,18% (N=7)	
	I don't know	13,33% (N = 4)	0% (N = 0)	23,53% (N=4)	
	I don't think so	6,67% (N = 2)	0% (N = 0)	11,76% (N=2)	
	Definitely not	3,33% (N = 1)	0% (N = 0)	5,88% (N=1)	
Knowledge of the concepts of green public procurement	Definitely yes	33,33% (N = 10)	61,54% (N = 8)	11,76% (N=2)	0,0147
	Rather yes	36,67% (N = 11)	38,46% (N = 5)	35,3% (N=6)	
	I don't know	13,33% (N = 4)	0% (N = 0)	23,53% (N=4)	
	I don't think so	13,33% (N = 4)	0% (N = 0)	23,53% (N=4)	
	Definitely not	3,34% (N = 1)	0% (N = 0)	5,88% (N=1)	

Source: own studies.

All office staff are familiar with the terms procurement and green procurement, a similar number are familiar with the concept of sustainability. Better familiarity with these concepts is therefore dependent on position. This was also confirmed in another study (Faracik, Szymonek, 2015). According to this study, the majority of the 16 people surveyed were familiar with the

term green procurement. However, the people surveyed were those involved in public procurement, so familiarity with the concept was due to the fact that respondents to the survey were selected from among those involved in public procurement.

The survey showed statistical differences between variables such as education, interest in climate change, familiarity with the terms public procurement and green public procurement. The statistical differences may be due to the difference in education of the respondents. Office workers tend to be more highly educated people who care about the environment and what is happening around them. Employees working outside the office are a broader group of employees. This group can include regional and shop managers, but also people who do manual work. Among this diverse group, there may be people without higher education or people who are simply not interested in these topics.

Further education on environmental protection and green procurement should therefore be carried out. It is important that as many people as possible are environmentally aware and that they support the organisation's commitment to green procurement. The results from the survey (Faracik, Szymonek, 2015) showed that knowledge regarding green public procurement is mainly based on which sector the respondents work in and whether they participate in various trainings and conferences. The second part of the research concerned the analysis of a public contract awarded by a public entity. The surveyed company entered a tender for the cleaning of selected university facilities in Podlaskie Voivodeship. The main criterion of the contract was the price of the service. The contract description presented the scope of the service to be provided. The contract description also presented the conditions of participation in the proceedings.

This analysis shows how procurement can easily be transformed into green procurement in line with good green procurement practices. The company makes use of various green technological innovations, and is constantly trying to keep up with changes in the market. Pro-ecological procedures not only reduce costs but, most importantly, contribute to environmental protection. The company uses environmentally friendly cleaning products manufactured on the basis of natural plant and mineral raw materials, and purchases them in large containers. This reduces the amount of waste generated, but also results in savings. Energy-efficient machines use less electricity, which leads to them being cheaper to use. The equipment used in the company also has all the necessary certificates. It is also important to segregate waste, which allows one waste bag to be used multiple times. The company also works with a paper towel manufacturer that recycles its own products. This service reduces the waste and carbon footprint of paper towels. In this way, the company contributes to the development of a circular economy society. It reduces the carbon footprint by at least 40% and reduces waste by 20% compared to other waste treatment options. New hygienic paper products are created from the towels recycled. As can be seen from the above, in order to transform procurement into green procurement, environmental requirements could be added to the criteria. A proposed solution for a transformed procurement is presented below (Table 2).

Table 2.*Green procurement proposal that could be awarded by a public university*

Employer	University
Type of order	service
Subject of the contract	Cleaning service for University buildings
Procedure (procurement mode)	open tender
CPV	90910000 Cleaning services
Pro-environmental instruments used in the proceedings	requirements in the description of the subject of the contract
Object requirements:	<p>1.1 The subject of the contract is a service concerning the cleaning of the university's buildings. The contract includes the cleaning of specific faculties, but also of the administration building and the library.</p> <p>1.2 All services must be environmentally friendly:</p> <ul style="list-style-type: none"> • Use eco-friendly preparations, cleaning products should be produced on the basis of natural plant and mineral raw materials and meet the requirements for marketing in the EU, use toilet paper and towels derived from recycled paper, • use of energy-efficient cleaning machines (e.g. hoovers, washing machines) that have low power consumption and all the necessary certifications, as well as cleaning machines with a defined maximum noise level, • separating waste, separate rubbish bags, reusing bags, and recycling paper towels. <p>The Contractor must be aware of all environmental regulations and apply them when carrying out the services.</p>

However, it can be done in yet another way by providing for different ecological criteria, such as the electricity consumption of machines, the percentage of use of ecological preparations, the use of innovative methods for separating rubbish or the measurement of CO₂ and pollutants. There can be many ways, it all depends on the creative ingenuity of those preparing the order.

The requirements outlined above are not excessive. Expectations such as segregating waste or using green products are basic conditions and do not require special preparation. Everyone is obliged to separate waste, so why should public organisations not go further and encourage contractors to use energy-efficient machines or natural products. The criteria presented are not a more expensive option for contracting authorities or contractors. By ordering products made, for example, from recycled material (paper towels), we are contributing to the effective and efficient separation of waste, as well as its reuse. The use of energy-efficient equipment by contractors reduces the need for electricity production and contributes to lower greenhouse gas emissions. By procuring services and products produced in an environmentally friendly way, the demand for those whose production uses, for example, many harmful chemicals is reduced. Achieving an environmental effect therefore depends on the qualitative and functional requirements placed on the subject of the contract and defined in the initial phase of the tendering procedure, which requires knowledge on the part of the contracting authority regarding the technical aspects of eco-innovation (Pożarowska, Olejarz, 2017).

An important element of good practice is a certain level of awareness and involvement of individuals on the part of the contracting authority. Involvement concerns those directly involved in the various stages of the procedure, those overseeing the implementation of the procurement contract, but also the decision-makers who have an impact on the overall functioning of the institution. Public employees' knowledge of sustainability, proficiency in applying mandatory solutions, ability to use non-mandatory tools and a broad perspective linking sustainable procurement with other areas of an institution's functioning can lead to significant results. Public organizations that invest in employee training will achieve their sustainability goals faster. It will also lead to sustainability innovation in the private sector (Darnall, Edwards, 2006).

A company bidding for an exemplary green public procurement contract would not incur additional costs, as it has already applied all good green practices for a long time. In this case, the type of tender would not make much difference to the contractor, thus commissioning the contract would not require an increase in expenditure for the public organisation. However, the use of green procurement could have a positive impact on the surrounding environment. Greening this procurement would therefore not affect the price of the service, but would have a positive environmental effect.

7. Conclusions

The study found statistical differences between a variable such as education and interest in climate change. More office workers are interested in climate change, which is linked to their education and the training provided for them. Place of employment and education therefore influence the level of interest in green procurement, a concept that all office employees are familiar with, while only a subset of non-office employees are also familiar with the concept, which didn't confirm the research hypotheses. Interest in green public procurement, depending on the place of employment, was also confirmed in another study (Faracik, Szymonek, 2015), but due to limited number of respondents the survey results should be confirmed on the wider population.

In addition, it has been shown that in fact any company can meet the environmental requirements to take part in green public procurement, as the criteria do not always have to be demanding, which confirmed the research hypothesis. Above all, it depends on the willingness and knowledge of the employees of public organisations about what green criteria they can include in the tender. Of course, other issues of greening public procurement in other areas (not only the cleaning services) should also be examined

In order to achieve sustainable results, it is necessary to introduce internal regulations of public organisations regarding the integration of environmental considerations into tender procedures. Public organisations will be more willing to use green procurement if they are also aware (in addition to their own awareness of the role of climate protection) that companies are ready for such procurement.

Public organisations should realise how easy it is to turn a public contract into a green public contract, as demonstrated in the contract under review. Of course, each procurement should be considered individually. Adding green criteria generally does not require additional time or resources from public organisations or contractors. Of course, there are also procurements that require more financial resources, such as the purchase of electric buses or the construction of a road with additional solutions favouring the movement of animals, e.g. corridors and passageways.

The main difficulties in including environmental aspects in tendering procedures include the insufficient knowledge and experience of contracting authorities with regard to their practical application. Therefore, it is very important to promote good practice in the development of model records of procedure documentation. Those responsible for the implementation of sustainable procurement should participate in thematic training, conferences and courses. This should have a positive impact on the frequency of green public procurement, which was confirmed in other studies (Darnall, Edwards, 2006; Faracik, Szymonek, 2015). Unfortunately, in Poland, the share of green public procurement in the total number of contracts was 1 per cent in 2020, which translates into only 384 contracts of an environmental or innovative nature (State Purchase Policy, 2022).

For wider promotion and widespread use of green procurement, the following are essential:

- motivation for the use of green procurement by senior figures in public organisations, including or especially by politicians,
- greater intensity of thematic training and courses for staff in public organisations, as staff should have the relevant practical skills, knowledge and access to the information they need,
- to correctly identify the objectives and priorities they want to achieve through green public procurement,
- inclusion of a mechanism for monitoring the execution of contracts,
- promoting green public procurement to residents so that they can see the positive changes coming from it,
- interest of a larger part of the population in climate change, so that during elections they elect people who will favour slowing down climate change.

References

1. Aczel, A. (2000). *Statystyka w zarządzaniu*. PWN.
2. Awanthia, M., Navaratnea, C. (2018). Carbon Footprint of an Organization: a Tool for Monitoring Impacts on Global Warming. *Procedia Engineering, Vol. 212*, pp. 729-735. doi: 10.1016/j.proeng.2018.01.094.
3. Cheng, W., Appolloni, A., D'Amato, A., Zhu, Q. (2018). Green Public Procurement, missing concepts and future trends – A critical review. *Journal of Cleaner Production, Vol. 176*, pp. 770-784. doi: 10.1016/j.jclepro.2017.12.027.
4. Chrisidu-Budnik, A. (2022). Zielone zamówienia publiczne w perspektywie transformacji energetyczno-klimatycznej. *Folia Iuridica Universitatis Wratislaviensis, Vol. 11, Iss. 2*, pp. 73-83. doi: 10.34616/145040.
5. Darnall, N., Edwards, D. (2006). Predicting the cost of environmental management system adoption: the role of capabilities, resources and ownership structure. *Strategic Management Journal, Vol. 27, Iss. 4*, pp. 301-320. doi: 10.1002/smj.818.
6. Esquivel-Patiño, G., Nápoles-Rivera, F. (2021). Environmental and energetic analysis of coupling a biogas combined cycle power plant with carbon capture, organic Rankine cycles and CO₂ utilization processes. *Journal of Environmental Management, Vol. 300*. doi: 10.1016/j.jenvman.2021.113746.
7. *Europarl.europa*. Retrieved from: <https://www.europarl.europa.eu/news/pl/headlines/society/20180301STO98928/infografika-emisje-gazow-cieplarnianych-w-unii-europejskiej>, 14.12.2021.
8. *Europarl.europa*. Retrieved from: <https://www.europarl.europa.eu/news/pl/headlines/society/20190313STO31218/emisje-co2-z-samochodow-fakty-i-liczby-infografika>, 15.12.2021.
9. Faracik, B., Szymonek, J. (2015). *Zrównoważone zamówienia publiczne w Polsce. Możliwości, bariery, straty (Report No. 1.)*. Warszawa: Creative Commons.
10. Geneidy, S., Baumeister, S., Govigli, V., Orfanidou, T., Wallius, V. (2021). The carbon footprint of a knowledge organization and emission scenarios for a post-COVID-19 world. *Environmental Impact Assessment Review, Vol. 91*. doi: 10.1016/j.eiar.2021.106645.
11. Johnson, P., Klassenof, R. (2022). New directions for research in green public procurement: The challenge of inter-stakeholder tensions. *Cleaner Logistics and Supply Chain, Vol. 3*, p. 100017. doi: 10.1016/j.clscn.2021.100017.
12. Kijewska, A. (2017). Analiza poziomów śladu węglowego dla świata i krajów UE. *Systemy wspomagania w inżynierii produkcji, Vol. 6, Iss. 2*. Retrieved from: <http://docplayer.pl/67718611-Analiza-poziomow-sladu-weglowego-dla-swiata-i-krajow-ue.html>. 10.10.2022.
13. Komisja Europejska (2016). *Ekologiczne zakupy! Podręcznik dotyczący zielonych zamówień publicznych*. Luksemburg: Urząd Publikacji Unii Europejskiej.

14. Lindfors, A., Ammenberg, J. (2021). Using national environmental objectives in green public procurement: Method development and application on transport procurement in Sweden, *Cleaner Production*, Vol. 280, Iss. 2, pp. 124821. doi: 10.1016/j.jclepro.2020.124821.
15. Łapczyński, M. (2015). Analiza porównawcza tabel kontyngencji i metody CHAID. *Zeszyty Naukowe Akademii Ekonomicznej w Krakowie*. pp. 149-163.
16. Masson-Delmotte, V., Zhai, P., Pirani, A., Connors, A., Péan, C., Berger, S., Caud, N., Chen, Y., Goldfarb, L., Gomis, M., Huang, M., Leitzell, K., Lonnoy, E., Matthews, J., Maycock, Y., Waterfield, T., Yelekçi, O., Yu, R., Zhou, B. (2021). *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. United Kingdom-New York: Cambridge University.
17. Mider, D., Marcinkowska, A. (2013). *Analiza danych ilościowych dla politologów. Praktyczne wprowadzenie z wykorzystaniem programu GNU PSPP*. Warszawa.
18. Nissinen, A., Parikka-Alhola, K., Rita, H. (2009). Environmental criteria in the public purchases above the EU threshold values by three Nordic countries: 2003 and 2005. *Ecol. Econ.*, Vol. 68, Iss. 6, pp. 1838-1849. doi: 10.1016/j.ecolecon.2008.12.005.
19. Pizło, W. (2009). Studium przypadku jako metoda badawcza w naukach ekonomicznych, *Stowarzyszenie ekonomistów rolnictwa i agrobiznesu*, Vol. 11, Iss. 5, pp. 246-251. Retrieved from: <http://yadda.icm.edu.pl/yadda/element/bwmeta1.element.ekon-element-000168016855>. 19.11.2022.
20. Polityka zakupowa państwa. Monitor Polski (2022).
21. Pożarowska, J., Olejarz, M. (2017). *Dobre praktyki w zakresie zrównoważonych zamówień Publicznych*. Warszawa: Urząd Zamówień Publicznych.
22. Słowińska, M. (2019). Wykorzystanie testu chi-kwadrat w badaniach preferencji żywieniowych konsumentów. *Nauki inżynierskie i technologie*, Vol. 1, Iss. 32, doi: 10.15611/nit.2019.1.0.
23. Vidal, R., Sánchez-Pantoj, N. (2019). Method based on life cycle assessment and topsis to integrate environmental award criteria into green public procurement, *Sustainable Cities and Society*, Vol. 44, Iss. 1, pp. 465-474. Retrieved from: <http://repositori.uji.es/xmlui/bitstream/handle/10234/181859/63627.pdf?sequence=1>. 16.10.2022.
24. Vigran, D. *Faster, more intense, with more devastating impacts: New IPCC report lays out the scientific basis of the climate emergency*. Retrieved from: https://talkofthecities.iclei.org/fastermore-intense-with-more-devastating-impacts-new-ipcc-report-lays-out-the-scientificbasis-of-the-climateemergency/?gclid=CjwKCAiAwKyNBhBfEiwA_mrUMj2Pt6g56JRviHRICfowemkH-w6vagpfWTIJ2LjIgrhcCiDN4DW8UhoCCOYQAvD_BwE, 10.12.2021.

25. Wang, Q., Wang, S., Zhang, M., Bu, Z., Liu, J. (2021). Green public procurement as a promoter for green consumption: From the perspective of individual's knowledge. *Cleaner and Responsible Consumption, Vol. 3*, p. 100035. doi:10.1016/j.clrc.2021.100035.
26. *World bank online*. Retrieved from: <https://www.worldbank.org/en/news/feature/2020/03/23/globalpublic-procurement-database-share-compare-improve>, 20.01.2022.