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# Review of Polish practices used in landscape assessment in the environmental impact assessment with a recommended procedure

## Abstract

The landscape impact assessment of planned developments is an important tool that supports landscape protection. As part of the analysis, the Environmental Impact Assessment (EIA) reports were reviewed in terms of the methods of landscape impact assessment (LIA) and landscape visual impact assessment (LVIA). The study was conducted in two stages, which made it possible to compare analyses prepared in Poland in 2004-2017 and 2018-2022. The conclusions of the review, supported by our scientific and practical experience, were the basis for developing a diagram for preparing landscape impact assessments. Considering the specificity of the given location and the type of the planned development, we recommend taking a reliable inventory and conducting a valuation of the landscape and creating alternatives of possible changes caused by anthropogenic interference and assess them in terms of landscape consistency.

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## 1 Introduction

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The surrounding landscape affects people's quality of life. Depending on the surrounding space, a person experiences peace or, on the contrary, is subjected to negative pressures (Kaplan and Kaplan, 1989; Kaplan, 1995), the quality of the landscape in which people live may affect their emotions and even behaviour (Kaplan and Kaplan, 2011; Park et al., 2020; Wang et al., 2019). The need for landscape protection was expressed in the European Landscape Convention (hereinafter: ELC), agreed by the Council of Europe in 2000. Its aim is to create an effective framework for improving the condition of European landscape. According to the ELC, landscape is defined as "an area, as perceived by people, whose character is the result of the actions and interactions of natural and/or human factors". Each country that signed this international document was obliged to implement its provisions into the national legal system.

In Poland, which is the largest member state of the central and eastern part of the EU, the objectives of the ELC were included in the provisions of the so-called "Landscape Act" (Journal of Laws of 2015, item 774). The Act introduced the notion of priority landscape, i.e. such landscape that is particularly important for the society due to its historical, natural or cultural values. Apart from that, the Act also introduced the obligation to protect areas of essential value for the environment and community. The ELC emphasises that all landscape types – urban, rural, particularly valuable landscapes, as well as ordinary or degraded ones, are equally valuable. This means that the principles of landscape development and protection should be specified for all landscapes as a whole, not only with respect to the most valuable, or with respect to "priority" ones. Each type of landscape is important, and each new element may upset its balance, introduce spatial chaos, or even irreversibly change its identity and thus the identity of the people connected to it. Landscape shaping should be inseparably linked to the protection of its cultural values. Every action, including the introduction of new elements, should take into account the existing local conditions, i.e., the so-called common landscape (Gil-Mastalerczyk 2016, Kühne 2009).

Landscape protection is also a part of the environmental impact assessment procedure that is conducted for development projects. Part of the assessment refers to potential negative influence on landscape values. The assessment is conducted for developments that always have a significant negative environmental impact (mandatory) and for projects that may potentially have such impact (optional). The amendment to the Environmental Impact Assessment (EIA) Directive of April 2014 introduced the obligation to assess the visual influence of the development on landscape (before that, it referred to landscape in general terms). However, no detailed definition of visual impact was provided, so the scope of assessment still remains an open issue (Giedych 2016).

This study aims to review practices used in landscape assessment under EIA performed in Poland. The objective of the article was to review the methods used in EIA reports with a focus on assessing visual impact. It was important to determine whether the assessments in the reports were carried out thoroughly and if they genuinely allowed for the evaluation of the impact of planned investments on the landscape. The practical goal was to formulate recommendations for conducting visual assessments, considering globally available methods (conclusions from the literature review) and taking into account the legal conditions of EIA in Poland.

## 2 Methods

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The study was conducted in three main phases (Figure 1). The literature review (phase 1) allowed for the presentation of the landscape impact assessment issues in Poland and a review of various methods used in LIA worldwide. In the second phase, EIA reports were thoroughly analysed concerning landscape assessments in Poland. In the final phase, based on the knowledge of existing LIA methods and issues in LIA procedures, a new approach to LIA was proposed, intended to be applied within the framework of EIA.

### 2.1 Phase 1 - Literature review

The first stage of the work was a review of the literature using the cherry-picking method. Its purpose

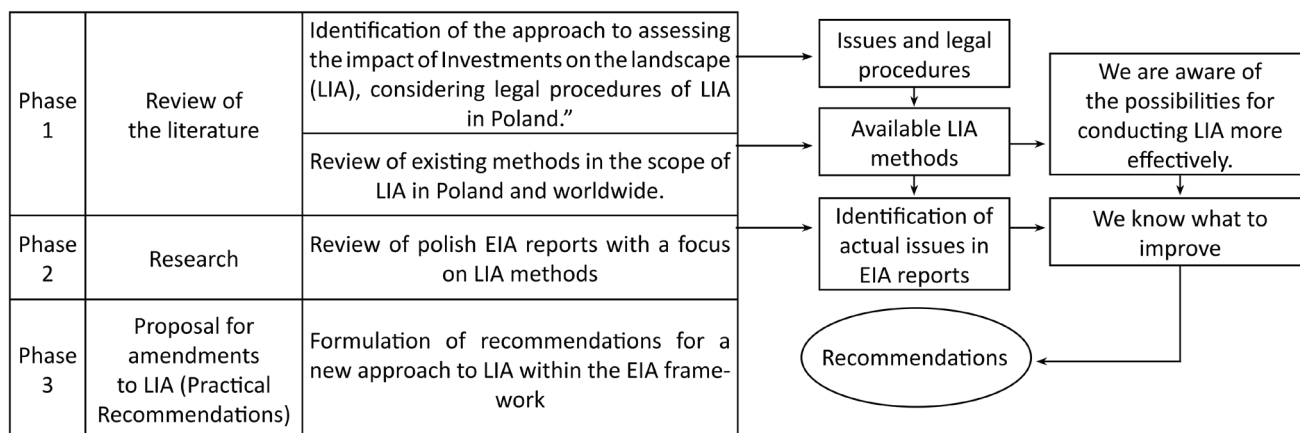


Figure 1. Work flow of the research.

was to define the concept of landscape, visual landscape and to recognize the methods used in landscape impact assessment as part of the environmental impact assessment (EIA).

### 2.1.1 Characteristics of the term “landscape”

Landscape is a concept that can be understood in different ways depending on the observer. Literature provides numerous definitions of landscape. Depending on their field of specialisation, scientists focus on various components of the landscape. Biologists and ecologists usually consider only the natural elements of the landscape (Kondracki and Richling 1947, Godron 1986, Czachorowski 1993, Łabno 2006, Chmielewski 2013), or, as David L. Armand (1980), the territorial complex, whereas landscape architects or conservators focus rather on the position of landscape in the cultural context. Such discrepancies, combined with the absence of a precisely formulated definition of landscape, lead to misunderstandings and may result in the loss of certain unique values. The reason for such an approach is the fact that landscape is very difficult to define, and it may have different meanings depending on the person. This is because landscape includes not only components that may be measured, observed, analysed, and finally assigned specific values, but also a hardly definable metaphorical value connected with local beliefs, culture, or history of the given place (Kühne 2018). The abundance of landscape definitions leads to numerous misunderstandings and offers the possibility to select any version that seems relevant in the given situation. This demonstrates how subjective the notion of landscape is. An

example of understanding landscape in the natural context is particularly visible when trying to determine the occurrence of specific types of landscape in a given space. Referring to its visual features makes it easier to isolate and characterize units with consistent physical features, similar topography or land cover (Chmielewski 2013; Garbulewski et al. 2015; Kistowski et al. 2018; Pokojnska and Bednarek 2012; Richling and Solon 2011).

Landscape can also be considered in a sociological aspect, in order to define the relationship between humans and the surrounding space in a more precise way (Leibenath and Otto 2014). Language also plays a significant role in defining the concept of landscape, as demonstrated by Drexler (2013,) the definition of the landscape may differ depending on the language in which we will describe it. Drexler (2013) argues that the concept of the landscape can be seen as contradictory in itself due to its multiplicity of meanings. These meanings may overlap to a varying degree and consequently lead to misunderstandings.

### 2.1.2 Development of landscape understanding in Poland

Due to the main objective and area of this research, we were focusing on the polish meaning of the word landscape. In the 18th century, landscape description (observed view) was called “krajopisarstwo” (Chmielewski 2013; Ostaszewska 2002). Furthermore, the word “krajobraz” (landscape) is a combination of the words “kraj” (country) and “obraz” (image, picture). Etymologically, it means “picture of the country”. The first attempts to define it date

back to 1829 (Lelewel 1829). To this day, the word “krajobraz” very often in everyday language refers to the definition of a view. The term is very often used as a synonym for the word “paysage” referring to a fragment of the Earth’s surface that we are able to capture in the form of paintings, photographs, or drawings. This means that the description is limited to external, visible features, primarily considering topography, vegetation and anthropogenic features. The scientific nomenclature also includes other landscape definitions to assist in its description, study and assessment. Most often, however, it focuses on the physical elements of the landscape, and to a lesser extent on climate, living organisms and human activities.

With regard to environmental impact assessments in Poland, the landscape is understood through the prism of the meaning of the term in Polish linguistic semantics.

### 2.1.3 Possibilities of landscape protection in Poland

For the purposes of this work, a definition of the landscape was adopted by the European Landscape Convention (ELC), where the landscape is understood as “an area perceived by people, the character of which is the result of the action and interaction of natural and/or human factors” (ELC, 2000). ELC explicitly emphasizes the importance of the visual dimension of the landscape and is often used in research on landscape perception (Sevenant and Antrop, 2009).

Landscape protection in Poland takes place on several levels (Żarska 2011; Zeidler 2014; Zbierska and Zydroń 2016; Kistowski 2012). In Poland, landscape protection is provided under the following legal acts:

- Act of 24 April 2015 amending certain acts in connection with the strengthening of landscape protection tools (Journal of Laws of 2015, item 774);
- Act - Environmental Protection Law of 2001 (Journal of Laws of 2021, item 1973);
- Act of 16 April 2004 on nature protection (Journal of Laws of 2021, item 1098);
- Act of 27 March 2003 on spatial planning and development (Journal of Laws of 2021, item 741);
- Act of 23 July 2003 on the protection and care of monuments (Journal of Laws 2021, item 710);

- Act of 28 September 1991 on forests (Journal of Laws 2021, item 1275);
- Act of 3 February 1995 on the protection of agricultural and forest land (Journal of Laws 2021, item 1326);
- Act of 21 March 1991 on maritime areas of the Republic of Poland and maritime administration (Journal of Laws 2020, item 2135).
- Regulation of the Council of Ministers of 11 January 2019 on the preparation of landscape audits (Journal of Laws of 2019, item 394);

The above documents contain rules concerning the protection of areas and individual elements that are particularly valuable on a local, regional, national and global scale (Żarska 2011; Gerlee 2006).

### 2.1.4 The importance of landscape impact assessment in the preparation of an environmental impact assessment reports

The development of new projects causes many discussions on all levels of planning. The commitment to maintain the existing landscape values remains an important issue during discussions concerning, for example, wind power generation and other large-scale developments. The fast-growing economy poses a clear threat to the environment and thus to the landscape. In connection with this, the topic of lowering the aesthetic and visual qualities and the appearance of dissonant elements in the space is also discussed. It can therefore be concluded that visual impact analyses should be considered already at the project planning stage. The LIA research should consider: the occurrence of the unique landscape elements and the duration of the negative impact.

In the case of implementation of developments that may significantly affect the environment, there is a need to prepare Environmental Impact Assessment Reports (EIA). The scope of the EIA Report is defined in Art. 66 of the Act of 3 October 2008 on the provision of information on the environment and its protection, public participation in environmental protection and environmental impact assessments.

One of the obligatory impact assessments refers to the potential impact of the planned project on the quality and values of the landscape. The landscape impact assessment (LIA), including the visual impact assessment, refers to all the components that make

up a given space. These are elements of the natural environment as well as of an anthropogenic nature. The visual impact assessment itself relates to the analysis of whether and to what extent the perception of the existing space will be changed. Through scenic analyses, we can examine the mutual scenic relationships in a given landscape and determine the structure of scenic connections in space (Forczek - Brataniec, 2018).

Research has shown that the perception of a landscape depends on its individual elements and the relationships between them, their values and the observer's previous experience and socio-cultural conditioning (Herzog, Herbert, Kaplan, & Croocks, 2000). It was also noted that the assessment of the landscape is largely dependent on the perception of the entire space, and not on the analysis of its individual elements. It allows us to conclude that we should "treat the landscape as an integral whole" (Jakiel and Bernatek-Jakiel, 2015). Thus, it seems obvious that it is necessary to prepare a description, analysis, and evaluation of the landscape where a development project is to be realised. It is essential to assess the changes that the given development will introduce to the landscape.

The assessment of the impact of planned developments on the landscape is a process that allows to avoid design mistakes that will interfere with the landscape during the construction process and after the completion of the development in the area thus, to prevent landscape devastation. Landscapes differ from each other. The unique combination of components, i.e., physical properties and anthropogenic influences, gives the space a unique character. One can hardly classify landscapes as better or worse ones; it is only possible to identify the space with a different set of properties that contribute to its identity.

### **2.1.5 Review of the available tools and methods for landscape assessment and visual landscape assessment**

Landscape assessment involves various approaches aimed at evaluating existing spaces and projecting the potential impact of new elements. Landscape analyses are providing a fundamental basis for planning activities in countries such as the USA, Canada, and the UK (Ozimek 2019b).

One prominent facet of landscape assessment revolves around visual evaluation, employing distinct methods to gauge the aesthetic aspects of a landscape. The Scenic Beauty Estimation (SBE) method quantifies visual appeal by soliciting observer assessments, thereby creating a mapped representation highlighting areas of pronounced visual value (Daniel and Boster 1976). Complementing this, the Visual Resource Management (VRM) technique meticulously delineates visual resources, ascribing numerical values considering potential viewers and their exposure time to envisaged developments (United States Department of the Interior 2013). Additionally, the Visual Impact Assessment (VIA) method centres on foreseeing the potential visual repercussions of proposed projects on the landscape. This entails a comprehensive multi-stage approach, encompassing the identification of visibility zones, characterization of landscape features, and demarcation of distinct landscape units.

Beyond the visual realm, the assessment of landscape character holds paramount importance. This approach encompasses an in-depth analysis of both visual features and the perceptual experiences of individuals encountering the landscape. It takes into account various elements including the natural features, anthropogenic interventions, and the nuanced perceptual factors that contribute to the overall landscape character (Tudor 2014, 2012).

However, evaluating the value of a landscape poses a considerable challenge due to the inherently subjective nature of perception. Proposed criteria for landscape value assessment encompass the state of preservation, variety, naturalness, and expressiveness of the landscape. Attempting to quantify these elements requires a delicate balance considering the diverse perspectives of different observers (Kistowski 2010).

Integrating human activity and its historical and cultural significance into the assessment process is another pivotal consideration. Many methodologies emphasize the intrinsic link between human activity and landscape assessment, acknowledging the historical and cultural dimensions that significantly influence the perception of a landscape (Chmielewski; Sas-Bojarska 2006; Myga-Piątek 2012; Stemmer and Bruns 2018).

Moreover, the advent of GIS technologies has revolutionized landscape assessment, offering advanced spatial management capabilities. GIS facilitates topographic analyses, view shed analysis, and precise determination of viewpoints, thereby enhancing the accuracy and comprehensiveness of landscape assessment (Kupiec and Dusza-Zwolińska 2021; Minelli et al. 2014).

To effectively convey potential visual impacts to stakeholders and decision-makers, visualization plays a vital role. Utilizing visualizations of proposed developments aids in presenting a tangible representation of potential visual alterations within the landscape. This visual aid helps in substantiating assessments and ensuring effective communication of the potential impacts to diverse stakeholders (Wojnar 2020; Visualisation Standards for wind energy developments 2010).

### **2.1.6 Polish approach to landscape impact assessment**

In Polish legislation, there are general legal acts aimed at protecting the landscape, but the lack of precise regulations and total freedom in interpreting the existing provisions on landscape assessment and protection lead to disturbance of the physiognomy and harmony of the terrain due to improper arrangement of objects (Sas-Bojarska 2017). Landscape protection in Poland is based mainly on the provisions of planning documents and acts on the protection of natural, cultural, or historical resources (Bogdanowski 1996; Ochrona krajobrazu w planowaniu regionalnym 2009). However, the problems consist in the fact that it is difficult to provide a precise definition of landscape (Kistowski 2010) and the lack of formal guidelines that would provide an action plan for performing a landscape impact assessment (Bazan-Krzywoszańska 2018, Degórski 2015). Although a definition of landscape is provided both in the ELC and in the Polish Act of April 24, 2015, amending certain acts in relation to strengthening landscape protection instruments, it is still difficult to define all its elements. However, it is worth noting that the legal protection of the landscape began from the moment of ratification of the ELC. As a result, it is necessary to develop guidelines that will constitute a recommended scheme of assessment including all individ-

ual elements that are analysed. Such steps should be taken already at the stage of developing planning documentation (such as Local Spatial Development Plan, Study of Conditions and Directions of Spatial Development, which are plans developed in Poland in accordance with applicable law) informing about potential land development directions. It is a part of spatial information and specifies the economic value of the given space. This enables to determine the development of the region also in terms of protecting landscape and cultural values (Bazan-Krzywoszańska 2018).

Jędraszko (2007) strongly emphasises the need to introduce spatial order characteristic for European cultural landscape. He also criticises the Polish attempts to “reinvent spatial management from scratch”. The absence of binding recommendations of the European Commission concerning space management led to a complete freedom in national management policy and, as a result, to a developmental chaos, where investors build “as they think fit” (Böhm 2006).

Another consequence of the absence of legal provisions that would regulate the process of analysing landscape impact assessment is the complete freedom in selecting the methods of assessment. The resulting chaos is reflected in the deteriorating condition of Polish landscape (Rybicka 2015). In the future, such oversights may cause strong degradation of the space and even the loss of its identity. The main problem encountered during the review of Polish literature about preparing landscape impact assessment and landscape assessment is scarce knowledge about the tools that are necessary to conduct the analyses correctly. The dynamic development of the economy caused significant changes in the surrounding space.

Landscape impact assessments are an essential instrument that supports landscape protection. The provided data from related fields and the analysis of correlations between them allow us to determine the potential changes in landscape more precisely. Additionally, the landscape itself should be assessed during the process of preparing the report. The description and analysis of specific landscape components are necessary to determine the elements that should be protected unconditionally.

The previously mentioned guidelines used in countries such as UK, USA or Canada are presenting the recommended course of actions and the manner of conducting landscape impact assessments. However, it should be noted that, although these publications provide excellent examples of preparing reports and they emphasise the essential aspects of the assessment, accompanied by potential methods of analysis, they are not necessarily applicable in Polish conditions (mainly due to the legal and institutional conditions). Numerous publications on landscape protection recommend applying these guidelines and creating recommendations adapted to the local conditions of the country (Badora 2017a, 2017b; Niedźwiecka-Filipiak et al. 2019; Richling 2013; Litwin 2009). Before developing new guidelines and proposing good practices in landscape assessment, it is however necessary to recognise the way of conducting these assessments at the stage of obtaining the decision on environmental conditions.

In Poland, most of the research on landscape concerns the harmony of the landscape and its visual representation. Land use, natural predispositions and possible directions of development are analysed (Richling A., 2013). In landscape architecture, a very often used method is the assessment of architectural and landscape units and interiors (Bogdanowski, 1994). It was also successfully used by Niedźwiecka-Filipiak (2009). The analysis of views and panoramas made it possible to isolate individual components of the landscape. However, it is relatively subjective and largely dependent on the knowledge and personal preferences of the observer.

In recent years, however, there has been an increase in interest in protecting and analysing landscapes, also in the context of assessing the potential impact on the landscape. Among Polish researchers, the works of Ozimek (2019b) and Forczek – Brataniec (2018) stand out. In both cases, attention is focused on the analysis of the visual features of the landscape using computer techniques. Attention is drawn to the lines, colours and shapes of objects in space, as well as to the contrasts in the landscape.

Due to the subjective nature of landscape perception, there is a need for further development of research on the possibilities of its description, assessment, and impact assessment of planned changes to it. It is also often emphasized that the observed continuous economic development, controlled only to a small extent, may irreversibly change the current character of the landscape. This will result in the loss of the spatial identity of its inhabitants and will have a negative impact on the preservation of historical, religious, and cultural values.

### 2.2 Phase 2 - Examining EIA reports

The desk research part consisted of the review of environmental impact assessment (EIA) reports in terms of methods and good practices used in landscape impact assessment (LIA) and landscape visual assessment (LVIA). The course of the study is presented in the Figure 2

The reports were selected for analysis, considering the selection of EIA procedures for developments for which, in accordance with the regulation on devel-

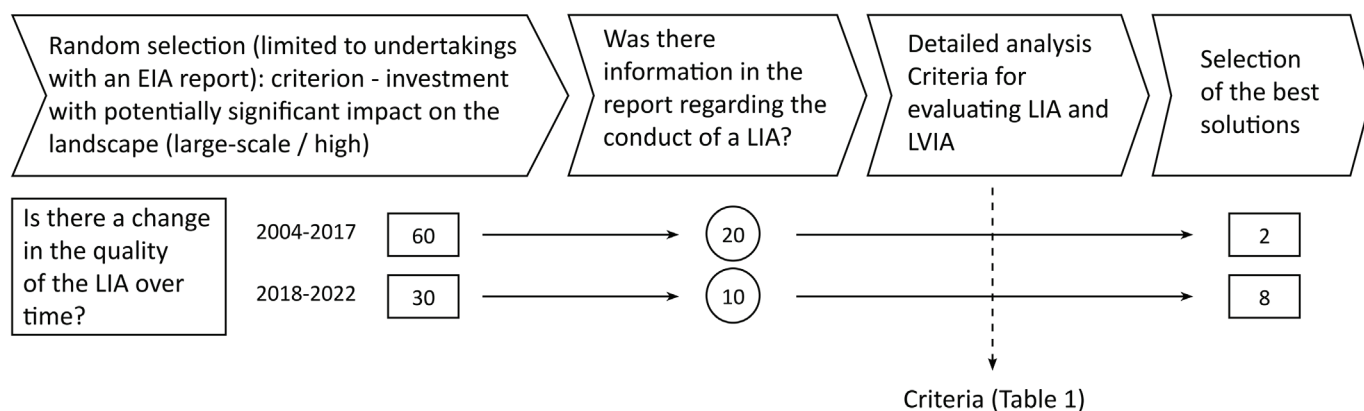


Figure 2. Investigation criteria for examining EIA reports.

opments that may have a significant impact on the environment (Journal of Laws of 2019, item 1839), it is mandatory to prepare a report (the so-called 1st group of projects). In addition, reports prepared for developments that may have a negative impact on the environment (the so-called group 2 projects) were considered, to which the authority issuing the environmental decision was obliged to prepare the report. The list of analysed reports is included in Appendix 1.

The literature review and the overview of available methods presented in the previous section provided a substantive basis for a proper assessment of the practices utilized in Landscape Impact Assessment (LIA) conducted within the framework of Environmental Impact Assessment (EIA) in Poland.

The research was conducted in two time intervals. The in first stage were the years 2004-2017, after the ratification of the ELC by Poland, so that the reports should focus more on landscape-related aspects. In this part of the research, from 80 reports only 20 were considered (those that included a landscape visual impact assessment). In the second stage, the analysis was carried out for reports published in the years 2018-2022. The purpose of the second period was to verify the differences in the methods of carrying out landscape impact assessment that could be observed over the years. In this case, 30 environmental impact assessment reports were selected for

analysis, out of which 10 were representative, with clear methodological assumptions (description of the methods used).

Individual reports were selected for analysis at random, considering publicly available documentation published on websites, based on the assumption that the selected developments should typically have a great environmental impact, for example due to their height or the size of the occupied area.

At the next stage, the documentation was analysed in terms of the applied methods of landscape assessment, focusing in particular on the application of visual assessment of the development's impact on landscape. The aim of the initial selection of reports was to choose only those that contained landscape visual assessment. This also allowed us to obtain preliminary information about the efficiency of EIA in terms of landscape protection. The third stage consisted in a detailed analyses (criteria – see in Table 1) based on the analysis of EIA reports, followed by the determination of good practices in the preparation of landscape impact assessment and landscape visual impact assessment reports.

### 2.3 Phase 3 – Elaborating recommendations

The last step was to create a recommended course of action for the execution of such reports. In principle, the scheme supposed to guide the analyse through the entire assessment process and enable it

**Table 1.** Criteria for evaluating reports in terms of LIA and LVIA.

Criterion name	Method of evaluation	Significance of the criterion
Adequacy of the detail of the LIA method used	Is the level of detail appropriate for the type of investment, location and scale of impact? YES/NO	The selection of methods with explanations is the basis for a properly conducted EIA, including LIA.
Field visit	Has field analysis been carried out, is there photographic documentation in the report? YES/NO	Absolute need to infer from current field research.
Consideration of the cultural landscape in the assessment	Has reference been made to the value of the cultural landscape within the impact area of the development? YES/NO	The need to refer to the occurrence of assets. If they do not exist - information about their absence is sufficient
Carrying out multi-variant analyses	Have the different options for the project been analysed in terms of their impact on landscape values? YES/NO	Relevant for developments with a significant impact on the landscape. If not - there should be a justification in the report as to why a multi-variant analysis was abandoned
Use of visualisations/ photo montages	Are the visualisations complemented by assessments (also made in graphic form) of the change in the landscape with justification? YES/NO	Visualisations should be used to carry out an evaluation, not just to present an investment.
Assessment of the visual quality of the landscape before and after the development (LVIA)	Has an assessment of the quality of the visual landscape been carried out before and after the development (using visualisation methods, visibility analyses, etc.)? YES/NO	A correct assessment of the impact on the visual landscape is only possible based on a comparison of the introduced change to the landscape



to be adapted to a specific place and the specifics of the project (described in section 3.2 – Recommendations). The applied method allowed us to review the most important sections of reports, considering in particular the descriptive part and graphic presentation of consequences for the landscape. Their level of detail and type of applied methodology were verified. The authors also checked whether the assessment included references to cultural landscape, including immaterial elements of space. Another important criterion was verifying whether the assessment analysed more than one variant of the planned development. This allowed us to verify all the most important aspects of landscape impact assessment for each report. The obtained results were then the basis for creating sample recommendations and guidelines with the aim to improve the process of assessing the landscape impact of developments.

### 3 Results

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#### 3.1 Insights from EIA reports

In the first period, 1/4 of the reports, and in the second, 1/3 of the reports in the section 3 (The work flow of the research), declared that a landscape impact assessment had been conducted. However, during the initial phase, only 19% of all analysed reports contained a Landscape and Visual Impact Assessment (LVIA), with the majority of these assessments primarily related to wind farms. For the second time frame, a visual impact assessment was conducted in nearly 50% of cases, and the analysed reports pertained to various developments, including roads, solar farms, and offshore wind farms.

For government authorities involved in the Environmental Impact Assessment (EIA) procedure, reports that solely provide a descriptive landscape impact assessment are considered sufficient. In our article, we focus on visual effects, specifically LVIA (Landscape and Visual Impact Assessment). Our primary concern is whether, within the scope of LVIA, the assessment can provide insight into how the visual quality of the landscape will change after the project's implementation. We are also seeking the best solutions that could be used to recommend an ap-

proach to LIA (Landscape Impact Assessment), in conjunction with knowledge from a global review of assessment methods.

In the first research period, the majority of analyses were limited to creating visualizations of the area with the planned investment, without additional assessments or explanations (10 instances). In as many as 12 reports, no on-site field inspections were conducted, and graphical material from the location of the planned investment was not included. In 15 cases, the assessment primarily focused on the “baseline” scenario, which is the landscape before the investment, without evaluating the changes to the landscape after its implementation.

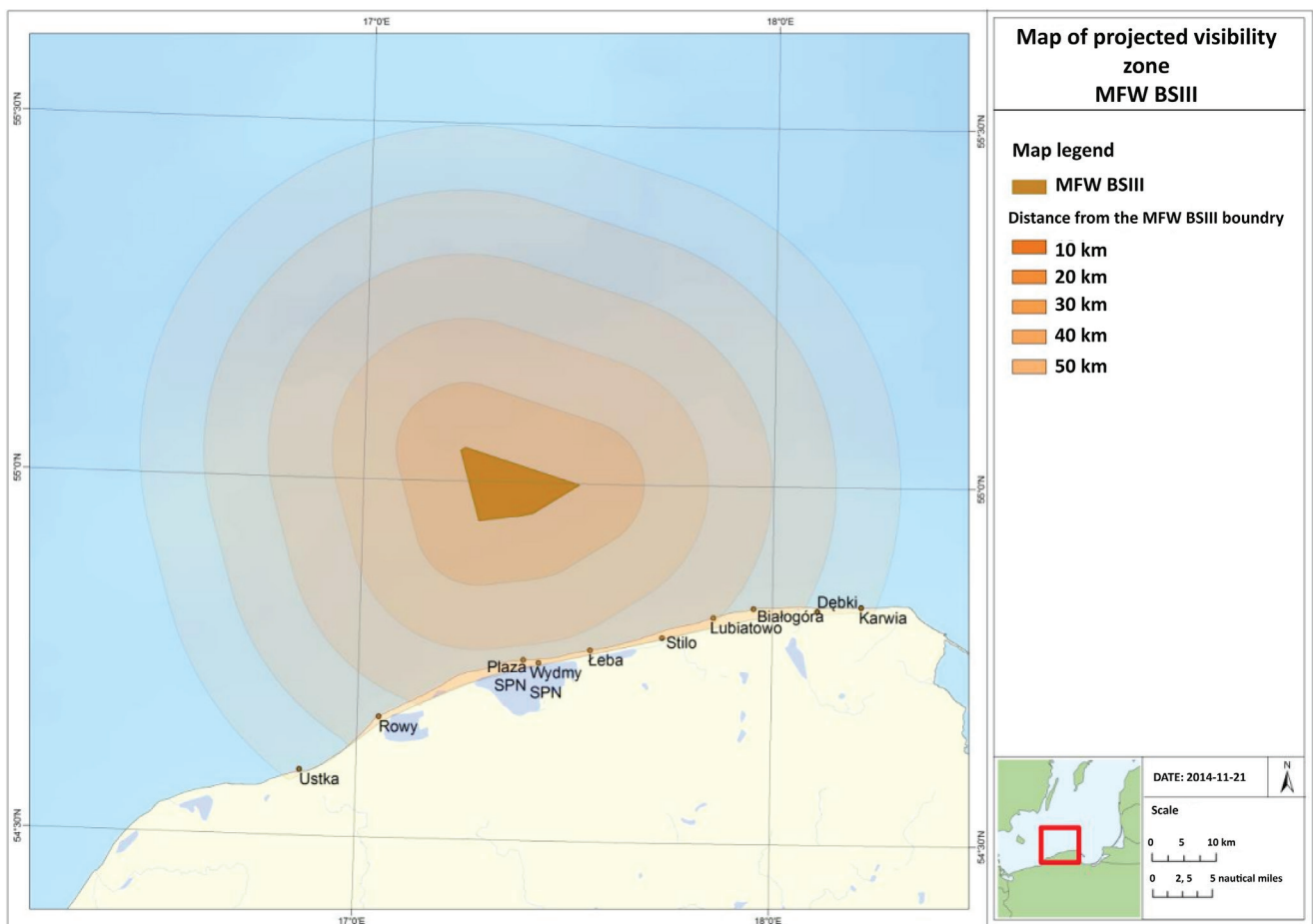
In cases where photo montage was used, the method involved only presenting turbines pasted into photographs (Figure 3). In some cases, a significant disturbance in perspective is visible, so that the image does not reflect the situation adequately.

The graphic materials were not accompanied by comments, and no assessment of impact on landscape values was conducted. Additionally, only “variant zero” of the development was assessed. This means that the analysis was made of a landscape that did not consider changes that the planned project could introduce. In this case, there is no reference to the potential impact of the development on the landscape. It is related to the fact that the authors of reports did not consider the possibility to introduce changes to the design in order to reduce the negative impact on landscape. As the report, together with the design of the development, constitutes the basis for issuing the decision on the environmental conditions for the realisation of the project, such presentation of data forces the authority issuing the decision to interpret the landscape impact on its own. The same applies to other participants of the EIA procedure, e.g., the community at the stage of public consultations. Reports prepared in such a way should not be considered as sufficient from the point of view of landscape impact assessment.

Two good examples were selected from the first research period: EIA report for the Baltic wind farm (Grupa Doradcza SMDI 2015) and the bypass road in Augustów (Sas-Bojarska 2008). In both cases, separate sections of the reports were created, that



**Figure 3.** View of the area of the planned development in Bełżyce (source: Report on the environmental impact of the development consisting in the construction of 1 small wind power plant of a power not exceeding 1000 kW and height below 100 meters in the town Bełżyce).



**Figure 4.** Map of the planned visibility range of the Baltic wind farm (Grupa Doradcza SMDI. 2019).

presented a detailed discussion of the potential impact on landscape values. Apart from project visualisation, analysis also include the detailed analysis of each view. For the Baltic wind farm views were presented for various times of night and day. This allows us to analyse the changes in the perception of the wind farm in various atmospheric conditions. Here, night-time visualisations are extremely important, as the turbines are lit, and thus more visible, at night (Figure 4).

Both examples demonstrate how important it is to determine the zone of potential visibility of the development. Without such information, it seems nearly impossible to identify the sites from which the development will be the most visible.

Moreover, the reports also analyse different variants of the development. This allows us to check, in which case the negative impact on landscape will be the strongest, and which will allow to preserve the values of the surrounding landscape. Such approach may also contribute to improving the planning process for similar projects in the future.

The conducted analysis demonstrated that most of the prepared reports (12 out of 20) did not specify the zone of potential visual impact, and that the scope of the conducted analysis was determined based on intuition or developed for the purposes of analyses of other forms of environmental impact. Unfortunately, these zones do not always cover the actual visual impact range. Incorrect determination of the visibility range quite often results in disturbing important views, covering historical objects or disrupting the harmony and changing the perception of

landscape. Another major irregularity is abandoning field inspections. Analyses based only on source and cartographic data does not allow making correct references to the analysed space, also due to the pace at which new elements of landscape are emerging. Additionally, the landscape assessment in the analysed reports referred only to the local scale of impact (14 out of 20 reports). The descriptions did not provide a reason for such approach. Thus, it is impossible to assess whether the development would be visible from larger distances (lack of a specified potential visibility zone).

The reports analysed in the second stage were characterized by a much greater level of detail of the analyses carried out. In 5 cases, the authors mapped the zone of potential visual impact, which allowed them to determine the scope of possible impact. The photographs were taken from places located in this zone. With the help of graphic programs, the planned project was visualized in the photographs. The analyses carried out largely related to the views from the height of the observer and referred to the potential impact on the quality of visual values and changes in the perception of the existing landscape. In the analyses, reference was also made to the characteristics of the cultural landscape and the nature of the landscape. In the case of visual assessment of the impact on the landscape, the most frequently used method was still the JARK method. Much more often, however, there was an analysis of the comparison of existing views with the visualization of developments in order to compare potential changes that could occur in space.

In most cases (8 out of 10), the landscape impact assessment also includes reference images that can clarify what the project will look like in the certain area (Figure 5). It should be noted, however, that the potential impact of a development located in a different type of landscape may have a completely different impact. Such images should therefore not be used as the basis for a LIA or LVIA procedure.

The report comparison made it possible to conclude that the status of landscape impact assessment reports carried out in Poland has improved, but it still cannot be unequivocally stated that they are carried out reliably and have a real impact on landscape protection. However, visual analyses have also been



**Figure 5.** Photo showing a reference image, which is an example of an acoustic barrier in the form of a green wall.

used for other types of investments, which significantly increases the effectiveness of landscape assessment in EIA reports.

### *3.2 Recommendations for preparing correct landscape impact assessments (proposed course of actions)*

Based on the conducted analyses, one may conclude that, although the methods of assessing the impact on landscape are well known and available, they are rarely used in EIA. This may result from the fact that the period for conducting EIA, including detailed landscape analyses, is too short, from the lack of sufficient funds to conduct such analyses or even low awareness of the value of landscape. As a result, there is a need to introduce certain regulations that will define the course of actions with the aim to improve the process of landscape impact assessment (Tokarczyk-Dorociak et al. 2019).

The vast majority of reports on the environmental impact are based solely on the description of the existing landscape and the indication of the potential impact typical for the implementation of a given type of development (change of landscape perception, disturbance of the view, reduction of landscape visual values).

Not much attention is paid to assessing the quality and value of a given landscape, nor is a sufficiently reliable scenic analysis carried out. The assessment of visual impact is still only a subjective feeling of the author. Photo montage is one of the most frequently used visual method of assessing the impact of project on the landscape. A noticeable change is the designation of viewpoints, but the stack of their typing is still not clear. There are also very rarely designate zones of potential visibility, which would significantly facilitate the selection of the most sensitive areas. The absence of adequate recommendations concerning the scope of assessment leads to a complete freedom in selecting the method. The fact that landscape is disregarded may also be noticed in the wrong selection of viewpoints and narrowing the scope of the conducted analyses to local risks.

Based on the analysis of the guidelines recommended for use in visual analysis contained in the previously mentioned publications and considering the

conclusions from the analysis of EIA reports prepared in Poland, the authors developed the objectives of the recommendations regarding the correct performance of the landscape impact assessment of planned developments, which should be carried out as part of the EIA. Based on the conducted research and the analysis of the literature on the subject, it was found that landscape assessment should contain information about:

- the zone of potential visual impact,
- type and sub-type of landscape,
- landscape units located in the area of potential impact,
- landscape value assessment,
- priority landscapes located in the given area.

One should also consider the fact that the last state of landscape impact assessment should consider potential mitigating measures. Proposing other available options may reduce the negative impact of the development on landscape and convince the investors to apply solutions that will be beneficial for them and compliant with environmental protection (including landscape protection) principles.

One of the main aspects that should be considered at the stage of developing the EIA for the given development is the fact that landscape should be treated as a resource that supports economic development, by improving the quality of life of residents and thus the value of property. One should make all efforts to ensure the use of available tools and introduce possible modifications so that the development introduces as few changes affecting the perception of space or disturbing landscape harmony as possible.

Since the analysis must be suitable for audiences from various social groups, it is necessary to use different means to illustrate the situation. Here, visual analysis seems to be the best solution, provided that they are prepared with all due precision and involvement. This is especially important during the selection of adequate forms of presentation, when defining the viewpoints from which the development will be best visible.

Based on the review of the literature on the subject, and the analysis of the EIA reports presented above, a diagram was prepared (Figure 6). It illustrates the specific steps that should help us to conduct a correct

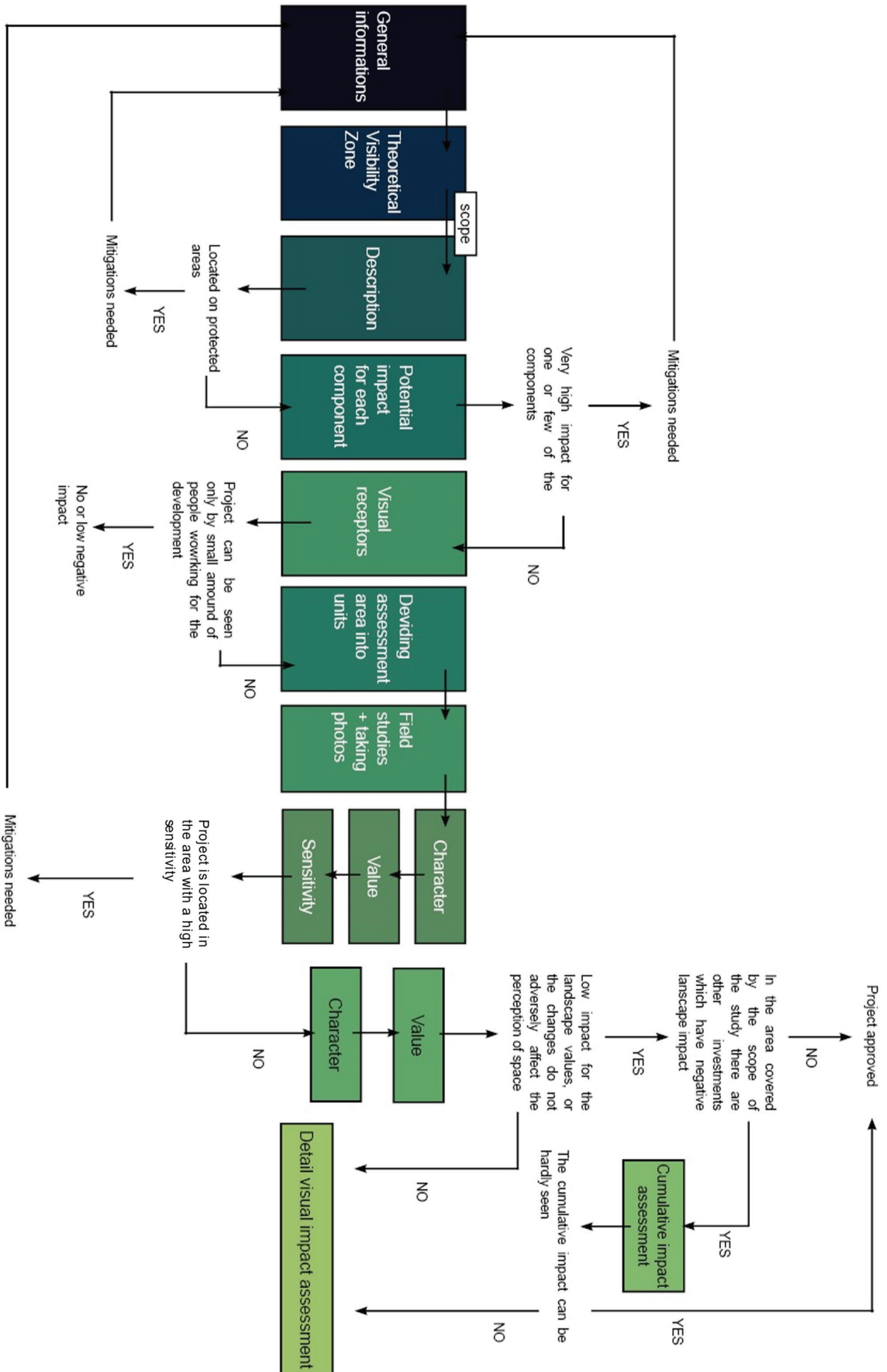


Figure 5. Diagram illustrating the sample landscape impact assessment process.

landscape impact assessment. The diagram presents parts of the data collection and analysis process. Its aim is to enable us to understand the landscape that we are dealing with in the best possible way.

The first step is to collect data about the planned project as well as general information about the space in which it is to be located. An important aspect at this stage is collecting all information about the development itself. It is important that the data should refer to specific physical properties of the introduced elements, with particular focus on their visual aspects (height, form, and colour). It is also necessary to define the changes in the development at various stages of its “life” (realisation, operation, and disassembly

Then, it is recommended to define a theoretical visibility zone, which will allow to determine the boundary of potential visual influence and thus determine the spatial scope of further analyses. To perform the analysis, it is worth using a Digital Elevation Model (DEM), which will allow to indicate possible visual barriers that obscure the planned project.

Having set the elaboration limit of the study, we can focus on collecting data from available data sources and processing them appropriately. The data should refer to aspects related to the characteristics of the local community, its beliefs, history, and traditions, as well as the natural properties of the space, considering the occurrence of unique landscape values. If a significant negative impact is found, it is necessary to introduce mitigations and conduct a repeated analysis.

In the next stage, it is necessary to indicate possible observers of the project. It is important to analyse roads, built-up areas and tourist hot spots that may attract users. It is also important to specify the time when potential users will be able to observe the planned development. By comparing the users’ map with the map containing the potential visibility zone, we can relatively precisely determine the most sensitive viewpoints.

After carrying out preliminary analyses and determining viewpoints, it is necessary to verify the conclusions in the field and to obtain additional data for further evaluation. The key here is to prepare properly made photographic documentation. The photos

should be taken at the eye level of the observer (approx. 1.7 m), in the direction of the development, in relatively good weather conditions (ideally photos should be taken from the same point in different weather conditions and times of the day). Based on the field vision and photographic documentation, individual landscape interiors should be analysed in terms of their character, value, and sensitivity of the views to the introduced elements.

The next step involves the visualisation of our observations. The viewpoints identified at the preceding stage become the starting point for preparing a visualisation of the impact of development on landscape. Taking photos of the views in a correct way is essential here. The photographs should be similar to images captured by human eyes. It is also recommended that the same views should be photographed at various times of day and in various weather conditions. It should be noted that every view needs to be presented in a comparable manner. This will allow us to determine the conditions when the development will be the most visible. Creating a collage or visualisation illustrating the potential changes is particularly important for public consultations. It is important to highlight the reliability and exact calculation of size and perspective within the visualization. One should remember that the form of presenting the consequences of the impact must be adapted to the specific audience with whom the project is consulted.

The conducted analysis will be very helpful in determining the scope of the impact and negative influence on the assessed views and panoramas. In order to determine these parameters, we should consider not only the visual aspect of the landscape, but all the components analysed at all the preceding stages. In this phase, it is also possible that it will be necessary to use expert analyses prepared for the purposes of assessing other components of the environment, to determine the landscape impact correctly.

The final stage of assessment should consist in proposing modifications to the project to minimise its negative landscape impact. Such suggestions may refer to the change of colour, limiting the number or size of the given development. It is also possible to propose solutions that consist in introducing new elements to “hide” the development. However,

one should always remember that these elements must be fully consistent with the nature of the given space: they should not interfere with the perception of the view, be disharmonious, or become a dominant element of the existing panorama.

It should also be remembered that in the case of some projects such a thorough analysis is unnecessary. Therefore, the diagram also contains information in which cases the possible negative impact does not exist or is so low that it is possible to discontinue further analysis.

## 4 Discussion and conclusions

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The problems with the conducted visual analyses were noticed by Badora (2017), Vissering (2011), Ozimek (2018), Forczek-Brataniec (2018) and Pyszny et al. (2016). Scientists and practitioners have emphasised the need to develop the method and guidelines that support landscape protection in the development process. New methods, aimed at objectifying the process, are still being developed (Tveit and Ode Sang 2014, Jovanovska et al. 2020, Wang et al. 2020). It is emphasised that the available methods do not allow for conducting landscape assessment to an extent that would enable to establish a legal basis regulating the assessment process. Research conducted in Poland emphasizes that it depends mainly on the reliability and precision of the input data (Pyszny et al. 2016) and the competence of experts conducting analysis under the EIA (Haładyj, 2020).

Research confirms that humans generally prefer rather natural landscapes to highly anthropogenic landscapes (Kaplan and Kaplan, 1989, Ulrich, 1986, Ulrich et al., 1991). The significance of negative impact on landscape values is greater in areas with high visual values than in areas assessed as less valuable (Betakova et al., 2015; Lothian, 2008; Molnarova et al., 2012). This indicates the necessity to perform landscape analysis also due to the recipient's preferences, but it is extremely difficult to conduct analysis in an objective way.

Examples from numerous countries demonstrate that one of the essential stages of landscape impact

assessment is the determination of the zone of potential visual impact with use of GIS methods. There are numerous ways to determine such zone, but research demonstrates that one of the most precise ones are analyses conducted based on the Digital Terrain Model. This method is commonly used in other European countries, including the Czech Republic (Skřivanová et al. 2014), Germany (Roth 2014, Roth 2013), and Spain (Torres et al. 2016). It is worth paying special attention to the methods that enable to determine the threshold values of percentage share of the surface area of wind turbines in reference to the total surface area of the analysed view (Badora 2017, Pyszny et al. 2016). Such approach allows for the identification of points from which the development will be the most visible and its potential negative impact will be the strongest. The problem is, however, the lack of more in-depth field studies that would foster a wider understanding of landscape. DTM analysis enables to identify most of the points from which the development may be observed, yet it does not exclude the points with the lowest numbers of users. In assessing the impact of planned developments on the landscape, one should take into account both the impact on individual components of the landscape (e.g., areas of natural or cultural value), as well as the possibility of reducing visual values, which should be related to the determination of the development visibility and determination of how it changed the perception of the landscape. The recommended steps proposed in the article indicate the need to enable conducting the field inspection in such a way that will allow to be aware of the actual situation in the field from the very beginning. The proposed course of actions is based on a comprehensive approach to landscape assessment. The authors attempted for its scope to cover various aspects of landscape, to make the landscape assessment as objective as possible.

The absence of detailed legal regulations defining the scope of visual impact analysis results in disregarding landscape and a complete freedom in selecting methods of its assessment. The conducted review of reports developed in the years 2005 – 2017 demonstrated that the quality level of Polish landscape impact assessments is low. The analyses very often omitted numerous important aspects that may irreversibly transform the nature of the space.

Visual analysis of landscape is usually completely neglected, and the impact assessment itself resembles a mere description of the given space, without considering the planned development.

Reports analysed in first stage showed, that projects that are subject to most detailed analysis were wind farms. This may prove that preparing a photo montage for such project is much easier than for other types of developments. In this case, we also have at our disposal the guidelines on the location of wind turbines: although they are not binding legal regulations, it is possible to create proposals that recommend their application. Better quality of landscape impact assessments for wind farms confirm that the standardization of impact assessments improves their quality, and thus may contribute to better protection. Similar conclusions were made by Tokarczyk-Dorociak et al. (2019) on the effectiveness of strategic assessments – for environmental components for which there are guidelines and additional legal requirements – the effectiveness of the assessment increases.

The review of EIA reports carried out in the second stage proved that the quality and complexity of the analyses performed for the purposes of preparing EIA reports have significantly improved. The landscape has become a resource, especially from the point of view of tourism. Therefore, assessing the potential visual impact is of particular importance also in relation to the quality of life of people (e.g. employed in the tourism sector). The possibility of determining the potentially negative impact on scenic values, and thus early detection of potential social conflicts, has meant that the authors of reports are increasingly opting for performing this type of analysis for the most problematic developments (motorways, bridges, solar and wind farms, mines, and tall buildings).

A closer look at the analysed cases reveals that merely conducting a graphic analysis does not make a correct assessment. In most cases, such analysis is limited to the visualisation of a randomly selected view. As a result, such analysis does not constitute a reliable source of information about the consequences that might potentially emerge.

Although landscape is subjective by nature, the subjectivity cannot be placed above a reliable assessment. In many cases, the analysis of consequences is left for individual evaluation of the recipient. It should also be noted that analyses often refer to changes of a local nature, while the potential consequences are analysed on a regional scale. The lack of research preceding design works results in a haphazard location of the development. This may be the basis for the conclusion that proper location of the development begins already at the stage of planning studies and analyses that directly precede the design actual works. This may allow to avoid numerous design errors. On the other hand, a proper location of the development may bring measurable benefits, of a material, natural or cultural nature.

As regards the performance of impact assessments (for all environmental components), there is a need to standardize the assessments performed. Landscape, as a subjective and difficult to assess good, needs, in particular, the development of guidelines and the promotion of good practices in the field of impact assessment. The proposed approach should contribute to the development of a standard for landscape assessment within the EIA.

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## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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## Appendix

The list of analysed reports.

Time Period	Nr	Name (in Polish)	Translation
2004-2017	1.	Raport o oddziaływaniu na środowisko przedsięwzięcia polegającego budowie zespołu turbin wiatrowych „Zarzecze Jeleniewskie” wraz z infrastrukturą.	Report on the environmental impact of the project consisting in the construction of the wind turbine complex "Zarzecze Jeleniewskie" together with the infrastructure.
	2.	Raport oddziaływania na środowisko dla inwestycji polegającej na budowie „farmy wiatrowej Pawłowo” składającej się z czterdziestu jeden turbin wiatrowych, położonej na terenie gminy Budzyń.	Environmental impact report for the investment consisting in the construction of the "Pawłowo wind farm" consisting of forty-one wind turbines, located in the Budzyń commune.
	3.	Raport o oddziaływaniu na środowisko zespołu elektrowni wiatrowych “Stare Bezewo” z infrastrukturą techniczną.	Report on the environmental impact of the “Stare Bezewo” wind farm complex with technical infrastructure.
	4.	Raport o oddziaływaniu na środowisko dla przedsięwzięcia: eksploatacja odkrywkowa złoża węgla brunatnego Gubin.	Environmental impact report for the project: opencast mining of the Gubin lignite deposit.
	5.	Raport o oddziaływaniu na środowisko dla przedsięwzięcia: Budowa kopalni i wydobywanie kopaliny – węgla kamiennego ze złoża „Lublin” w granicach projektowanego obszaru i terenu górniczego „Kulik”.	Environmental impact report for the project: Construction of a mine and extraction of a mineral - hard coal from the "Lublin" deposit within the boundaries of the planned area and the "Kulik" mining area.
	6.	Raport o oddziaływaniu przedsięwzięcia na środowisko dla inwestycji polegającej na: „Budowie elektrowni wiatrowej o mocy do 3,5 MW, o wysokości całkowitej do 215 m i szerokości łopaty do 130 m na nieruchomości oznaczonej w ewidencji gruntów i budynków jako działka o nr ewid.351/2, 352, 353, 354, 355 w miejscowości Dulsk, gmina Radomin”.	Report on the impact of the project on the environment for the investment consisting in: "Construction of a wind farm with a capacity of up to 3.5 MW, with a total height of up to 215 m and a blade width of up to 130 m on the property marked in the land and building register as plot no. 351/ 2, 352, 353, 354, 355 in Dulsk, Radomin commune."
	7.	Raport o oddziaływaniu na środowisko. Budowa i eksploatacja farmy wiatrowej „Krupy I”.	Environmental Impact Report. Construction and operation of the “Krupy I” wind farm.
	8.	Raport o oddziaływaniu na środowisko farmy wiatrowej „Żuromin FW2” w gminach Kuczbork-Osada I Żuromin (pow. żuromiński, woj. mazowieckie).	Report on the environmental impact of the "Żuromin FW2" wind farm in the Kuczbork-Osada and Żuromin communes (Żuromiński powiat, Mazowieckie Voivodeship).
	9.	Raport o oddziaływaniu na środowisko przedsięwzięcia polegającego na budowie zespołu elektrowni wiatrowych wraz z niezbędną infrastrukturą towarzyszącą na obszarze gminy Lgota Wielka (w okolicy miejscowości: Ligota Wielka, Wola Blakowa, Woźniki i Długie).	Report on the environmental impact of the project consisting in the construction of a complex of wind farms with the necessary accompanying infrastructure in the area of the commune of Ligota Wielka (in the vicinity of the villages of: Ligota Wielka, Wola Blakowa, Woźniki and Długie).
	10.	Ocena oddziaływania na środowisko dwóch elektrowni wiatrowych w miejscowości Lipowo, gmina Szypliszki, województwo podlaskie.	Assessment of the environmental impact of two wind farms in Lipowo, Szypliszki commune, Podlaskie Voivodeship.
	11.	Raport o oddziaływaniu na środowisko elektrowni wiatrowych zlokalizowanych w Miłowie, gmina Przywidz, powiat gdański, województwo pomorskie.	Report on the environmental impact of wind farms located in Miłów, Przywidz commune, Gdańsk powiat, Pomeranian Voivodeship.
	12.	Raport o oddziaływaniu na środowisko obwodnicy Augustowa w ciągu drogi krajowej nr 8 od skrzyżowania drogi krajowej nr 8 z drogą krajową nr 61 do węzła „Lotnisko”.	Report on the environmental impact of the Augustów bypass along the national road No. 8 from the intersection of the national road No. 8 with the national road No. 61 to the "Lotnisko" junction.
	13.	Morska farma wiatrowa Bałtyk III. Raport o oddziaływaniu na środowisko.	Baltic III offshore wind farm. Environmental Impact Report.
	14.	Raport oddziaływania na środowisko: Budowa farmy wiatrowej “Mirów-Wierzbica” wraz z infrastrukturą towarzyszącą na terenie gminy Mirów i Wierzbica.	Environmental impact report: Construction of the "Mirów-Wierzbica" Wind farm with accompanying infrastructure in the Mirów and Wierzbica commune
	15.	Raport oddziaływania na środowisko budowy urządzenia infrastruktury technicznej - turbiny wiatrowej w okolicy miejscowości Czyżewo, Rypin, powiat rypiński województwo kujawsko-pomorskie.	Report on the environmental impact of the construction of a technical infrastructure device - a wind turbine in the vicinity of Czyżewo, Rypin commune, Rypin powiat, Kuyavian-Pomeranian Voivodeship.
	16.	Raport o oddziaływaniu na środowisko przedsięwzięcia: Budowa elektrowni wiatrowej „Safronka (92/18)” wraz z infrastrukturą towarzyszącą, o mocy nominalnej do 2,5 MW.	Report on the environmental impact of the project: Construction of the "Safronka (92/18)" wind power plant with accompanying infrastructure, with a nominal capacity of up to 2.5 MW.
	17.	Raport oddziaływania na środowisko farmy wiatrowej Kościerzyn Wielki o łącznej mocy DO 9,6 MW w obrębie geodezyjnym miejscowości Kościerzyn Wielki gmina Wyrzysk, powiat pilski.	Environmental impact report for the Kościerzyn Wielki wind farm with a total capacity of 9.6 MW within the geodetic area of Kościerzyn Wielki, Wyrzysk commune, Piła powiat.

## The list of analysed reports (continued).

<b>2004-2017</b>	18. Raport o oddziaływaniu na środowisko farmy wiatrowej o łącznej mocy do 60 MW wraz z niezbędną infrastrukturą techniczną na działkach oznaczonych numerami ewidencyjnymi: 37, 92/1, 99, 86, 135, 48, 51, 26, 197, 207, 212, 220 obręby ewidencyjne Gębarzewo, Goraniec, Nidom Goranin, Kąpiel, Kosowo, Szczytniki Czerniejewskie Gmina Czerniejewo, powiat gnieźnieński, województwo wielkopolskie.	Report on the environmental impact of a wind farm with a total capacity of up to 60 MW along with the necessary technical infrastructure on plots marked with registration numbers: 37, 92/1, 99, 86, 135, 48, 51, 26, 197, 207, 212, 220 precincts registration office Gębarzewo, Goraniec, Nidom Goranin, Kąpiel, Kosowo, Szczytniki Czerniejewskie Czerniejewo commune, Gniezno powiat, Wielkopolskie voivodeship.
	19. Raport o oddziaływaniu na środowisko przedsięwzięcia pn.: Budowa parku elektrowni wiatrowych w rejonie miejscowości Trębaczów na terenie gminy Perzów wraz z niezbędną infrastrukturą towarzyszącą.	Environmental impact report: Construction of a wind farm park in the area of Trębaczów in the Perzów commune, together with the necessary accompanying infrastructure.
	20. Oddziaływanie na środowisko przedsięwzięcia polegającego na budowie 1 małej elektrowni wiatrowej o mocy nie większej niż 1000 kW i wysokości poniżej 100 metrów w miejscowości Bełżyce.	Environmental impact of the project consisting in the construction of 1 small wind farm with a capacity of not more than 1000 kW and a height of less than 100 meters in Bełżyce.
<b>2018-2022</b>	21. Raport o oddziaływaniu na środowisko: Budowa farmy fotowoltaicznej „Międzyrzecz I”.	Environmental impact report: Construction of the “Międzyrzecz I” photovoltaic farm.
	22. Raport o oddziaływaniu na środowisko: Budowa budynku mieszkalnego wielorodzinnego ‘Portico Marina’ z częścią usługową, garażem podziemnym, wjazdami, wyjazdami, infrastrukturą techniczną, budynkiem dla stacji trafo oraz elementami zagospodarowania terenu.	Environmental impact report: Construction of a multi-family residential building ‘Portico Marina’ with a service section, underground garage, entrances and exits, technical infrastructure, a building for a transformer station and elements of land development.
	23. Raport oddziaływania na środowisko przedsięwzięcia pn. „Budowa i eksploatacja elektrowni słonecznej nr 3 o mocy do 1,0 MW wraz z infrastrukturą towarzyszącą, obręb Młyniec Pierwszy, gmina Lubicz, powiat toruński, woj. kujawsko-pomorskie”.	Environmental impact report for the project entitled “Construction and operation of the solar power plant No. 3 with a capacity of up to 1.0 MW along with the accompanying infrastructure, Młyniec First precinct, Lubicz commune, Toruń powiat, province. kujawsko-pomorskie”.
	24. Raport o oddziaływaniu przedsięwzięcia na środowisko „Farma fotowoltaiczna Kotuń”.	Report on the environmental impact of the project "Kotuń photovoltaic farm".
	25. Raport o oddziaływaniu na środowisko dla inwestycji pod nazwą: Budowa farmy fotowoltaicznej o mocy do 16 MW wraz z niezbędną infrastrukturą techniczną na działkach o nr ewidencyjnych 24/1; 25/2 w obrębie Sułaszewo w gminie Margonin.	Report on the environmental impact for the investment under the name: Construction of a photovoltaic farm with a capacity of up to 16 MW along with the necessary technical infrastructure on plots with registration number 24/1; 25/2 in the area of Sułaszewo in the commune of Margonin.
	26. budowa elektrowni fotowoltaicznej pv Bruszkowo-Wielichowo wraz z infrastrukturą towarzyszącą w gminie Słupsk.	construction of a photovoltaic power plant in Bruszkowo-Wielichowo with accompanying infrastructure in the commune of Słupsk.
	27. Ocena oddziaływania na krajobraz inwestycji pn."Budowa budynku usługowo-biurowego na działkach nr 13, 30/8 i 30/10 wraz z budową drogi dojazdowej do terenu inwestycji przy ul. Wyzynnej w Lublinie".	Assessment of the impact on the landscape of the investment entitled "Construction of a service and office building on plots No. 13, 30/8 and 30/10 along with the construction of an access road to the investment site at Wyzynna Street in Lublin".
	28. Ocena oddziaływania na środowisko: Budowa drogi ekspresowej S16 na odcinku Mrągowo - Orzysz - Elk	Environmental impact assessment report: Construction of the S16 expressway on the section Mrągowo - Orzysz - Elk
	29. Raport o oddziaływaniu na środowisko: Budowa Mostu Wschodniego we Wrocławiu.	Environmental impact report: Construction of the Eastern Bridge in Wrocław.
	30. Raport oddziaływania na środowisko dla przedsięwzięcia pn.: Budowa budynków w zabudowie mieszkalnej wielorodzinnej z usługami wraz z niezbędną infrastrukturą techniczną, w Szczecinie.	Environmental impact report for the project entitled: Construction of buildings in multi-family residential development with services together with the necessary technical infrastructure, in Szczecin.