MSc Program
Environmental Technology & International Affairs

The Future of Environmental Reporting and its consequences for the GRI

Case Study: A comparative Analysis of four companies

A Master's Thesis submitted for the degree of
"Master of Science"

supervised by
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Affidavit

I, **SARAH BAGHDADY**, hereby declare

1. that I am the sole author of the present Master's Thesis, "THE FUTURE OF ENVIRONMENTAL REPORTING AND ITS CONSEQUENCES FOR THE GRI - CASE STUDY: A COMPARATIVE ANALYSIS OF FOUR AUSTRIAN COMPANIES", 63 pages, bound, and that I have not used any source or tool other than those referenced or any other illicit aid or tool, and
2. that I have not prior to this date submitted this Master's Thesis as an examination paper in any form in Austria or abroad.

Vienna, 11.06.2017

Signature

Abstract

Corporate action has always an impact – on the economy, the environment and the society. The Global Reporting Initiative (GRI) has been introduced in order to provide uniform reporting standards for all companies independent from their field and country of operation or their size. Effective environmental reporting is necessary in order to take actions, which are required for decreasing negative impacts on the environment. Thus, reporting standards and methods have to be continuously improved and adopted to our dynamic environment. In this thesis, a conflation of a theoretical approach with a practical approach leads to a conclusion on these probable future improvements and developments of environmental reporting frameworks, especially the GRI. On the theoretic side, critical remarks of academics regarding the GRI are analyzed. The practical approach comprises a comparative analysis of environmental reports of four companies in two different sectors, respectively two companies in each sector. This approach allows both, intra-sectorial and cross-sectorial comparison. The compared companies are *VERBUND* and *OMV* in the field of energy as well as *Wienerberger* and *Palfinger* in the field of construction materials. The juxtaposition of the theoretic and the practical approach results in the conclusion that environmental reporting steers towards a more mandatory framework. Furthermore, environmental reporting moves towards the model of Integrated Reporting, which merges the reports for the economy, the environment and the society. The GRI has to transit from an approach of compatibility with other international reporting frameworks to one of complementarity in order to maintain its prominence. The comparative analysis provides evidence that the content of environmental reports are barely comparable and that such comparison between industries is not expedient. Therefore, complete standardization cannot be the goal of future developments of environmental reporting; instead, the goal of transparency becomes more prominent. Moreover, environmental reporting frameworks will increasingly emphasize the importance of a comprehensive materiality principle, which is crucial for the meaningfulness of environmental reports.

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List of abbreviations

AG	Aktiengesellschaft (stock corporation)
BDO	Binder, Dijker, Otte (Auditing and tax advisory firm)
CERES	Coalition for Environmentally Responsible Economies
CO2e	CO2 equivalents
CSR	Corporate Social Responsibility
DMA	Disclosures on Management Approach
e.g.	exampli gratia - for example
EDO	Extra Document
EU	European Union
GHG	Greenhouse gases
GRI	Global Reporting Initiative
GSSB	Global Sustainability Standards Board
IIRC	International Integrated Reporting Council
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organization for Standardization
NaDiVeG	Nachhaltigkeits- und Diversitätsverbesserungsgesetz (law on non-financial and diversity disclosures)
NFR	non-financial and diversity information
NGO	Non Profit Organisation
OECD	Organisation for Economic Co-operation and Development
OMV	Österreichische Mineralölverwaltung
PwC	PricewaterhouseCoopers
SASB	Sustainability Accounting Standards Board
SDG	Sustainable Development Goal
SEC	Security and Exchange Commission
UN	United Nations
UNGC	United Nations Global Compact
wbcsd	World Business Council for Sustainable Development
WKO	Wirtschaftskammer Österreich (Austrian Chamber of Commerce)

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1. Introduction

> *"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development 1987, P. 41).*

The first definition of sustainable development appeared in 1987 in the Brundland Report, which is still the basic definition of sustainable development in international agreements. It was the first legal framework, which encompassed sustainability as a central aspect to development (Sustainable Development Commission 2011). The purpose was to counteract the environmental challenges we face. Originally, the concept of sustainability is much older and comes from forestry, where it refers to the capacity of the trees to regrow in such a manner that does not compromise the quality of the forest and its species in any way (Aachener Stiftung 2015).

However, sustainability is still widely discussed and has become increasingly prominent. The majority of scholars and scientists agree that the challenges concerning the environment such as environmental degradation, pollution and thus climate change are mainly caused by human activity. First and foremost, corporate action has caused resource scarcities, a loss of biodiversity and heavy pollution, whose consequences have to be carried out not only by our current generation but also future generations. These consequences are increasing prices due to shrinking availability of inevitable resources, rising temperatures caused by ozone depletion, decreased living quality and increased health risk due to heavy pollution, but also food and water scarcity in developing countries. This list is only a minor part of what uncontrolled corporate activity has caused and threatens to intensify in the future (IPCC 2013).

Thus, it becomes evident that governments need to control and limit resource exploitation and pollution of companies to counteract such negative developments. In order to do so, firstly measurements of environmental impacts are necessary to know where environmental degradation happens and what causes it. This is why good environmental reporting is essential for future change. After measuring and reporting, companies have to take action in order to minimize their negative impacts. Albeit the primary goal of companies is not to preserve the environment but rather to maximize

profits, they must comply with legal regulations and take the needs of their stakeholders into account. Moreover, the publication of environmental reports results in the improvement the image of a company and could lead to efficiency increases.

Nevertheless, it is still up to the company to decide which standards to use in the drafting of the reports. Many different standards have developed over time. Among them, the Global Reporting Initiative seems to take an internationally leading position (Seele and Wagner 2016). However, we are living in a highly dynamic environment. The market is constantly changing and growing globalization affects the economy and the society. Companies are subject to continuously changing pressures coming from the authority, coming from customers and coming from the market. This underlines the importance of continuous adjustability of reporting frameworks such as the GRI. Therefore, this thesis investigates the past and tries to make assumptions on the future of environmental reporting. These assumptions base on stakeholder opinions and a comparative analysis of the environmental reports of four companies.

This thesis is sectioned in three main parts, which compromise 4 subsumed research questions. Firstly, the thesis encompasses a theoretic study of the subject, secondly, a practical approach via a comparative analysis and thirdly, a conclusion part, which merges the theoretic and the practical approach. These three parts aim to answer 4 research questions. Research question one is: "*Why has the GRI failed to adequately respond to the criticism of providing too much flexibility in reporting and thus results in too little standardization?"* Furthermore, I deal with the questions *"What are the current trends of the GRI and environmental reporting in general?"* and *"What are the presumable future developments of environmental reporting and what are their consequences on the GRI?"* These questions are mainly answered with the information covered in the first theoretic part of the thesis. However, the following case study in the second part adds an additional perspective to the questions. The fourth subsumed research questions are: *"How is the comparability of the reports? What are the influence and the approach of different sectors to environmental reporting?"* These are answered through a 4-step comparative analysis within the case study in part two.

The first part focuses on a theoretic approach and covers the historic emergence of environmental reporting and its development to the status quo. Firstly, section 3.1.

summarizes the journey of environmental reporting and especially the GRI, which is additionally put into context of the history of environmental reporting. This provides a solid basis for the estimation of its future. Section 3.2. provides a detailed description of the GRI G4 and encompasses an overview of its changes in comparison to the previous version, the GRI G3.1. Such detailed explanation of the environment related content of the G4 is necessary in order to be able to follow the critique points and especially the following case study. Consequently, section 3.3. illustrates the partnerships of the GRI with other international frameworks such as the United Nations Global Compact (UNGC) and the Sustainable Development Goals (SDGs). Under this aspect, also the connection of the GRI with the Directive 2014/95 EU of the European Parliament and the Council will be reviewed. However, this section focuses on the link of the environmental category to the SDGs. Thus, it comprises an overview of those environmental indicators that influence the specific SDGs. These interconnections provide essential information on why the GRI prevails in current environmental reporting and give incentives on the direction of future environmental reporting. Closing the first part, section 3.4. and 3.5. analyse how the GRI has been and is currently examined and criticized by different stakeholders. Furthermore, the main points of criticisms are discussed and examined in a holistic view.

In this regard, one of the strongest points of critique since the inception of the GRI has been that companies have too much leeway in preparing their reports. The G4 even provides more freedom for companies by introducing the principle of materiality (Boiral and Henri 2015). Moreover, one of the major changes between the G4 Guidelines and the newly developed GRI Standards to their predecessor the G3.1 is increased flexibility in the use of the Standards. The GRI Standards, which comprise the same content as the G4 in a developed structure become effective on the 1st of July 2018 (GRI 2017f). Nonetheless, this leads to the question *why the GRI has failed to adequately respond to the criticism of providing too much flexibility in reporting and thus resulting in too little standardization?* A first attempt to answer and discuss this question is presented in section 3.4.

The GRI Standards provide topic-specific Standards for the economy, the environment and the society. Even though the aim of the GRI is that these topic-specific Standards are used together, they are presented in three separate documents (GRI 2017d).

Nevertheless, the connections between these categories cannot be denied. Society affects economic success, economic success in most cases means increasing production, which affects the environment and the environmental situation has effects on both, the economy and the society. Moreover, disclosing all the information in one Integrated Report provides a broader context of the disclosed information. These are the main ideas of Integrated Reporting, which seem to become increasingly prominent especially among multinational companies. From this perspective and also taking into account major critique points of the GRI, the following questions arise: *What are the current trends of the GRI and environmental reporting in general? What are the presumable future developments of environmental reporting and what are their consequences on the GRI?* Firstly, the answers to these questions are discussed in the sections 3.3. and 3.4.

The second part follows a practical approach comprising a case study. This case study consists of a comparative analysis of environmental reporting of four different companies. The purpose of the case study is mainly to support, rebut or add a perspective to the conclusions made in the first part. On the one hand, possible effects of providing much flexibility in creating an environmental report are illustrated via the comparison of actual cases. On the other hand, the comparative analysis adds another perspective to the discussion of the theoretic part. Thus, the comparative analysis together with the theoretic investigation enables a holistic reflection on the topic and provides a better understanding.

The four analyzed companies are VERBUND and OMV in the energy sector, and Wienerberger and Palfinger in the construction sector, which are presented in more detail in section 4.1. This introduction includes the field of activity of the companies and general facts. In addition, their history with sustainability reporting is shortly raised. Subsequently, in section 4.2. the comparative analysis is conducted, which encloses four thematic steps. These steps are the comparison of the individual materiality analyses, the scopes of environmental reporting, a comparative analysis of the report contents as well as of the approaches and attitudes towards environmental reporting. In the course of the comparative analysis obstacles of varying severity arise. Furthermore, difficulties become evident due to the differing application of indicators. In this context, the following questions are answered: *How is the comparability of the reports? What*

are the influence and the approach of different sectors to environmental reporting? Ultimately, conclusions of the case study are drawn in section 4.3.

The third and last section of the thesis unites the conclusions of the theoretic and the practical parts and discusses the posed questions again in a holistic manner. Furthermore, the limitations of the conclusions and the case study are demonstrated and suggestions for further research are made.

2. Methodology

This research is carried out by a combination of a theoretic and a practical approach. Moreover, the conclusions of these two approaches are merged for final conclusions. The theoretic approach comprises an investigation of the formation process of environmental reporting and the GRI. First of all, the investigation starts out with the emergence of environmental consciousness in the international community. From there on, the research for the thesis on the historic development of environmental reporting merges and summarizes discussions around that topic from the publications of papers, books and studies that originate in a time slot starting in the 90ies until now. This provides a realistic picture of the perception of environmental protection and of necessary actions in order to minimize environmental degradation. Transparency of corporate action via impact-disclosure is an essential aspect to this discussion.

In connection with the evolvement of environmental reporting, several international frameworks resulting in more environmental protection developed, among these the GRI. The journey of the GRI including its major milestones over the years until now is described in the consequent section. The Information for this description is mainly taken from the GRI webpage, which provides a detailed and well-structured summary of events. Furthermore, the principles of the G4 are explained in more detail on the first hand in order to understand the following points of critique and on the other hand in order to ensure a basic understanding of the G4. This basic understanding is important to be able to follow the steps of the case studies. However, the most important information to know about the G4 is extracted from the G4 package itself, this means from the documents “Reporting Principles and Standard Disclosures” and “Implementation Manual” as well as from the document “Frequently Asked Questions”, which describes the key stones of the G4 in more detail.

The following illustration of the connections of GRI with other international frameworks bases on various sources. Firstly, the document Reporting Principles and Standard Disclosures foresees a specific section to describe the partnership of the GRI with selected other international frameworks. In addition, the respective international frameworks publish information to their relationship to the GRI from their perspective. The information from both sides is used and summarized for the description. This section mainly focuses on the connection of the GRI to the SDGs. The document "Linking SDGs and GRI" developed by the GRI, the UNGC and the World Business Council for Sustainable Development also provides detailed information and is the foundation for the created table. This table shows, reporting of which environmental indicators could contribute to which SDG.

The investigation of the major critique points bases on publications of academics, heads of sustainability of different companies and NGOs. Furthermore, members of the think tanks such as GreenBiz and SustainAbility published several reports regarding weaknesses of international frameworks for environmental reporting. SustainAbility is a think tank and consultancy, which does research in the field and supports companies in contributing to a sustainable economy. It was founded in 1987, which means that it has been in place during the entire process of the inception of environmental reporting (SustainAbility 2017). Moreover, also GreenBiz advocates and environmental responsibility for companies (GreenBiz 2014). The discussion of these stakeholders is analyzed and the major common points of critique are aggregated and discussed in a holistic view, taking into account different perspectives. Furthermore, some aspects of criticism are taken out and are elaborated further. In addition, I make some own critical remarks, which I debate with supporting arguments.

The practical approach is conducted as a comparative analysis in a case study. The case study is mainly based on the GRI content Indices of the four selected companies and the documents referenced in the Indices. These documents are Integrated Annual Reports, Annual Reports, Sustainability Reports including Update Reports and extra documents. However, the comparative analysis concerns the environmental category exclusively. All the documents are freely available for download on the official webpage of the respective company.

The selection of the compared companies bases on the list of companies published on the GRI database, which is accessible via the GRI webpage. This list comprises those companies, which prepare their reports in accordance with the GRI. I selected the companies based on the freely accessible version of this list, which is limited and does not lodge claim on completeness. Furthermore, I set up the following criteria, which were a prerequisite for the selection: Firstly, I have limited the selection to Austrian companies. This does not exclude companies that operate internationally, but creates better access to information from the respective companies and facilitates potential correspondence with the companies. Moreover, I have excluded companies, which do not create their reports according to core option of the GRI G4 in order to make concrete conclusions about the GRI. In addition, the publication of the report in the year 2015 was a prerequisite to analyze the most recent data available at the starting time of research. Also the size of the companies was decisive in the selection for an improved comparability. The chosen companies operate on a large/multinational scale. I picked two companies from the same sector of the remaining enterprises to allow inter-sectorial comparison and two companies from another sector to be able to also cover cross-sectorial comparison. Thus, the choice fell on VERBUND, OMV, Palfinger and Wienerberger. VERBUND and OMV operate in the energy sector, whereas Palfinger and Wienerberger operate in the construction sector. Thus, it is possible to get a broader picture of the application of the GRI in reality.

Furthermore, I use information published on the respective company webpage and the reports for the introduction of the companies. However, the consequent comparative analysis represents the major part of the case study and consists of 4 steps: a comparative analysis of the materiality analyzes, of the scope of environmental reporting, the degree of comparability of the content reports and the approach of the companies to environmental reporting. Firstly, the individual materiality analyzes of the companies are compared. For the comparison of the materiality analyzes, I list the top 10 as material identified topics in the first instance. In the second instance, I add all the environment-related material topics to the list. I create a table with the four lists of material topics in order to provide an overview that facilitates a comparison. Furthermore, I highlight similar topics in the same color to be able to recognize common features among the companies. Similar material environmental topics are

reviewed and are briefly put in context with the field of action of the company if necessary. In addition, the main differences in material topics are analyzed among and within the sectors.

Consequently, the scope of environmental reporting of the four companies is compared, which constitutes the second pillar of the comparative analysis. The comparative analysis of the scopes is based on the environmental category of the GRI Index and the amount of indicators disclosed in the respective reports. Thus, the scope analysis is related to the materiality analysis, since the companies are obliged to report on at least one indicator for each identified material aspect in order to be in accordance with the core option of the G4. The number of aspects and indicators, on which the companies report is counted and summarized. Furthermore, not reported aspects are aligned with the materiality analysis in order to find a reason for non-disclosure. All in all, the scope analysis helps to make statements on different application types of the G4 core option in terms of the amount of reported indicators.

The third step is a comparative content analysis of environmental information disclosed in the reports. Therefore, the aspects energy and emissions serve as examples for drawing conclusions on the comparability of the report content. I have chosen the aspects energy and emissions because they constitute two major topics for environmental reporting. Furthermore, energy efficiency and emission limits are embedded in the Austrian legislation, which is why comparability of these aspects would be highly advantageous. The comparative analysis bases on the environmental indicators encompassed in the GRI content Index for these two aspects. The initial plan was to compare all the indicators within the respective aspects. However, I come across obstacles at an early stage of the analysis, which prevents me from conducting a qualitative comparison. Nonetheless, the obstacles and difficulties I encounter during the attempted comparison lead to an informative conclusion itself. In the fourth step, the approach and attitude of VERBUND, OMV Palfinger and Wienerberger towards environmental reporting is derived based on the company-histories of environmental reporting of the individual companies and based on the first three steps.

Ultimately, the final conclusions are made based on the outcome of the theoretical investigation and the results of the case study. The arguments and conclusions of both

approaches are contemplated together to complement, contradict or expand the perspective on them. Thereby, conclusive statements can be made from a holistic research.

3. Evolution of Environmental Reporting and Development of the Global Reporting Initiative (GRI)

After the publication of the Brundtland report in 1987, which laid out the definition of sustainable development, the international community gathered again in 1972 for the United Nations Conference on the Human Environment in Stockholm (thus often referred to as Stockholm Conference 1972). The Stockholm Conference is seen as the starting point of environmental policy. As the name indicates, the Stockholm Conference specifically focused on the consequences of environmental degradation on human beings and their interaction with the environment. It concluded in the Stockholm Declaration, which comprises 26 principles concerning human action, the environment and development. In this context also the connection between the environment and security started to emerge and became an important topic of discussion. At the same time, the media began to make subject of environmental issues and their consequences for human beings. This increase in public awareness lead to a shift of public opinion towards environmental protection and more transparency of corporate action (NGO Committee on Education 2014; Sachsman 2002). Thus, companies started to not only face pressure from national legislation, but also from international agreements and especially from the public. Even though the public opinion does not have legal consequences, it is an important factor for the success and the reputation of companies (Sachsman 2002).

Environmental reporting of companies has a long history of development and goes back to the late 1980ies/early 1990ies. Initial ideas of environmental reporting of companies and organizations came up for various reasons. Despite the fact that the pressure from various stakeholders and legal requirements play an essential role, companies also have internal motives in preparing an environmental report. Thus, their incentives base on external and internal stakeholder interests. On the one hand, companies prepare environmental reports for external stakeholders such as customers, clients and the authority. Environmental reports are in general prepared in order to provide

transparency of corporate action and to ensure compliance with legal requirements. Especially health and safety play an important role for corporate action. Companies have to account for a safe work environment as well as a safe environment of the area, in which they are operating. They have to make sure that no employees and the surrounding community is not exposed to any danger due to their activities. Furthermore, in case of customers and clients as targeted groups, the preparation of environmental reports illustrates environmental consciousness and aspiration for improvement. In addition, it shows that a company is not reluctant of providing transparent information on corporate action and is readily willing to disclose environmental information. Thus, it gains public legitimacy (from the society as well as from the media and NGOs) and enhances its standing in general, which also supplements marketing strategies (Aloisi de Larderel et al. 1998, 1997; Bennett, James, and Klinkers 1999; Sachsman 2002).

Companies prepare environmental reports for internal purposes. As indicated before, environmental reports comprise valuable information of corporate performance. This information can be used to improve the processes of the company and to optimize them. Additionally, it can point out potential risk and opportunities, which is crucial for strategic considerations and the evaluation of future developments. Therefore, the information for preparing an environmental report can be used to enhance corporate performance and thus to achieve higher cost-effectiveness. Furthermore, the disclosures of corporate impact on the environment, positive and negative impacts equally, can make abstract corporate activities and issues somehow more concrete and understandable. Thus, the report of a company can also partly be seen as a basis for decision-making and strategic planning (Aloisi de Larderel et al. 1997, 1998; Bennett, James, and Klinkers 1999; Elkington et al. 2006; GRI 2015b).

These reasons for environmental reporting still accurate in these days. Nevertheless, during the course of time the environmental situation, in which we live in and in which future generations will be born into has deteriorated tremendously. With this deterioration and the advancement in communication technologies, which are easily accessible to everyone in the developed world, the voice of environmental activists rose and spread. Thus, the public increasingly became aware of the dimensions of environmental degradation we face. Against this background also policymakers were

urged to take further action. Therefore, the "trend" of environmental reporting gradually grew over time and is still in a process of constant development (Elkington et al. 2006; IPCC 2013; Townsend, Bartels, and Renaut 2010).

More specifically, the 5th assessment report of the IPCC found that the rate of environmental degradation has increased and continues to do so if no immediate action is taken. Moreover, the report provides evidence that these changes occur to a bigger part due to human activities. The main acting parties that cause this increasing rate of climate change are companies. This underlines the urgency of environmental protection from the side of companies. Actions must be undertaken now instead of postponing them into the future (IPCC 2013). Implicitly, a qualitative evaluation of the environmental impacts of corporate action is necessary, which shifts the focus from quantitative reporting towards qualitative reporting.

3.1. The Journey of the GRI

Many different frameworks for environmental performance evaluation with different approaches developed all over the world. In the 1990ies for example the United States strongly argued in favor of an incentive-based regulation, in which companies would voluntarily report due to resulting public recognition and potential cost-effectiveness. Furthermore, some institutions have introduced a system of external ratings, through which certificates could be acquired. Companies would also do so voluntarily and even against payment of a specific fee, because such certificates contribute their Corporate Social Responsibility strategy (CSR). In the light of the Kyoto Protocol, countries also imposed legal regulations concerning the disclosure of specific environmental impacts, which can be seen as an attempt to impose legal requirements for environmental reporting on companies. However, these regulations did not concern a very wide scope of aspects but only the greenhouse gas emissions (GHGs), which were to be regulated under the Kyoto Protocol. Nevertheless, this is only an extraction of incentives and regulations that constitute the outset of environmental reporting (Bennett, James, and Klinkers 1999).

However, the major question on how to create these reports and how to measure the environmental impact arose. Consequently, also critics arose especially in regards of

reliability and comparability of the environmental reports. Thus, a range of different standards for environmental reporting started to develop. Among these, also the International Organization for Standardization (ISO) developed standards and tools for companies to comply with their environmental responsibilities. In 1997/1998 the GRI Guidelines were drafted by the Coalition for Environmentally Responsible Economies (CERES), the Tellus Institute and the involvement of the United Nations Environment Programme (UNEP). The initial aim was to provide a framework for accountability and the compliance with the ten CERES principles, according to which companies commit to protect the environment. Around one year later, in 2000, the first version of the GRI was launched, which can be seen as the beginning the era of comprehensive Sustainability Reporting (Ceres 2017; GRI 2017c).

In the course of the following years, the demand for a strong and qualitative GRI grew, and so did the organizational structure of the GRI. The idea was and still is to involve all relevant stakeholders in the creation process of the standard. This aspect probably reached one of its peak in 2006, when the GRI held a Conference on Sustainability and Transparency with the title "Reporting: A Measure of Sustainability", where over 1000 people participated from various sectors and fields, be it from academia, companies, the civil society or the government. Participants from 65 developed and developing countries were present to discuss and elaborate the third generation of the GRI, the G3. In the same year, the GRI widened its strategy and entered into partnership with the UNGC. Now, it also points out its relation to the SDGs. However, these interconnections and partnerships will be discussed in section 3.3 (GRI 2017c).

In addition, the publication of guidelines on how to use both, GRI and ISO, was an important development of the GRI. These guidelines support the combination of both rather than focusing on a principle of exclusion. In 2013 the fourth conference "Information – Integration – Innovation" resulted in the fourth generation of the GRI, which is the latest update of the GRI Guidelines. In 2014, the Global Sustainability Standards Board (GSSB) was established, which is still responsible for standard setting. Furthermore, the GRI Index Service was introduced, which is supposed to serve as verification service and content orientation, navigation through the report. Upon criticism, the GRI developed an exam in order to accredit those, who are responsible of creating the report in accordance with the G4 (GRI 2017c). This G4 exam consists of 60

multiple choice questions and issues a certification if the person scores 75% or more (GRI 2017a). Furthermore, the project "Reporting 2025" was launched and lasted 12 months. The aim of this initiative was to identify problems, which companies will face in 2025 that would affect their reports (GRI 2017c).

However, the content of the most recent update of the GRI Guidelines, the G4, has been transformed into the GRI Standards. The GRI Standards represent the first globally recognized and accepted standards for Sustainability Reporting. While the content remains the same as in the G4, mainly six aspects were changed in GRI Standards. First and foremost, the structure of the GRI Standards is module based. These modules are interrelated and comprise content from the G4 Guidelines and the G4 Implementation Manual. A major advantage of such a modular structure is that updates and developments of single modules can be published instead of the revision of the complete document. Secondly, the GRI standards use a clearer language to distinguish between requirements, recommendations and guidelines. The clarification on content is further extended to the most relevant concepts and disclosures of the G4. Moreover, companies and organizations reporting according to the Standards are granted with more flexibility but are also obliged to more transparency. In order to avoid duplication and to guarantee a logic sequence of the reported impacts, the GRI Standards rearranged and restructured the content of the G4. And finally, the whole language of the G4 revised and simplified for better understanding (GRI 2017f).

The central idea behind the GRI has been from the beginning of its creation until now to create a global framework for sustainable standardized reporting. With the evolvement of Integrated Reporting, which is supported by the GRI, it also aims to push reporting more towards Integrated Reporting. This means taking into account the linkages between financial, social and environmental performance as well as providing a broader reporting context. In addition, the multi-stakeholder approach of development and the emphasis on constant learning and improvement are essential features of the GRI, which contributes to a big part to its prominence (Bennett, James, and Klinkers 1999; GRI 2017c; Seele and Wagner 2016).

However, the ISO standards and the GRI Guidelines are not the only reporting frameworks. Rather late, in 2011, the Sustainability Accounting Standards Board

(SASB) was established in the USA (SASB 2012). Furthermore, the International Integrated Reporting Council (IIRC) published their first framework in 2013 (IIRC 2017). The main difference of the SASB to the other frameworks is that it is closely linked to the Security and Exchange Commission (SEC) in the US and thus bases on compliance-approach rather than a principle-approach (Leinaweaver 2015; SASB 2012). The main difference of the IIRC to other frameworks is that it advocates and provides a framework for Integrated Reporting. The GRI builds on topic-specific standards for the economy, the environment and the social sphere even though it also aims at concurrent preparation. However, while the GRI collaborates with the IIRC – in fact it is a co-founder – and supports the use of both standards simultaneously, there is no such thing with the SASB (GRI 2016, 2017e; Seele and Wagner 2016). Most likely this is due to the fact, that the approach to materiality of these two is contradictive.

3.2. Principles of the GRI – G4

As mentioned in the previous section, the fourth generation of the GRI, the G4, is the latest update of the GRI Guidelines, which was the result of the conference "Information – Integration – Innovation" in 2013. Around 1600 participants from 69 countries took part in the conference to involve them in the creation of the G4. In general it is up to the company when to do the transition to the G4. However, it is recommended for all reports published after the 31st of December 2016 to do so (GRI 2015a, 2017c).

Companies have to make a remark on the report whether they created the report 'in accordance' with core option or with the comprehensive option of the G4. The core option represents the basis for the comprehensive option, which builds on the core option. While the core option requires reporting on the generic DMA and at least one indicator to every aspect considered as material by the company, the comprehensive option requires this for all indicators. Furthermore, the comprehensive option foresees extended General Standard Disclosures (GRI 2015a, 2015b). The following description focuses on the core option due to the fact that it is the less stringent option for companies to still be in accordance with the GRI G4. Furthermore, the reports of the companies examined in the case study are prepared in accordance with the core option of the GRI.

The principles on which the G4 is based on are divided into 4 principles for the definition of content of the report and 6 principles for the definition of the quality of the reports. The principles for defining the report content are Stakeholder Inclusiveness, Sustainability Context, Materiality and Completeness. Stakeholder inclusiveness means that in the report the stakeholders should be identified including specific actions undertaken by the company in order to satisfy their needs. Sustainability Context implies that the company should present its performance in a wide, sustainable context. The principle of Materiality constitutes the basis of the whole report and is – from the part of those who established the G4 – considered a milestone in the history of the GRI. Materiality is used throughout the documents and requires the company to identify material aspects on its own. An aspect should be considered as material if it reflects the company's significant impacts on the economy, the environment and the social sphere. Thus, a material aspect has substantial influence on stakeholder decisions and assessment (GRI 2015b). The GRI describes: *"Material Aspects are those that reflect the organization's significant economic, environmental and social impacts; or substantively influence the assessments and decisions of stakeholders"* (GRI 2015b, p.7). Such focus on materiality provides the company with more flexibility especially regarding the scope of reporting (GRI 2015b).

The previous version of the GRI, the G3.1 determined a minimum number of indicators for the specific standard disclosure was needed in order to be in accordance with it (Seele and Wagner 2016). The G4 does not require a specific quantity anymore. This can be seen as a response to one of the major critique points of the G3, which was accused of putting the focus on quantity rather than on quality. However, the abolishment of a minimum number of indicators is intended to be compensated by the principle of completeness, which states that all aspects that are significant should be declared as material (GRI 2015b; Seele and Wagner 2016).

The principles for defining report quality are Balance, Comparability, Accuracy, Timeliness, Clarity and Reliability. A balanced report requires the disclosure of positive and negative impacts in order to allow a realistic assessment of the company's performance. In addition, a qualitative report should be comparable in the sense of consistency in the preparation of the report. Thus, improvements but also deteriorations can be evaluated. The principle of comparability also refers to the presentation of the

report. It has to be presented in a way, which can be understood by stakeholders with reasonable effort. Furthermore, the information given in the report should be accurate and clearly described for similar reasons. Timeliness means that the information is made available in time so that the stakeholders can make their decisions based on this information. All in all, the information provided in the report has to be always reliable. In other words, the company has to disclose the background of it, such as processes used. This disclosure has to be presented in a manner that allows verification and supports quality and materiality (GRI 2015b).

The G4 specifies on General Standard Disclosures and Specific Standard Disclosures and consists of two documents, which are the Reporting Principles and Standard Disclosures and a separate Implementation Manual. General Standard Disclosures describe the general topics, which a company has to disclose. These comprise information on the company's strategy and analysis, a review of the organizational profile and their material aspects with their boundaries. Furthermore, disclosures on stakeholder engagement and report profile including the GRI content Index are essential parts of it. Also, the company's governance strategy as well as ethics and integrity are elements of the General Standard Disclosures. However, companies reporting according to the core option do not have to disclose information on strategy and analysis, governance as well as ethics and integrity (GRI 2015b).

The Specific Standard Disclosures on the other hand deals with Disclosures on Management Approach (DMA) and Indicators by aspects for the categories economy, environment and social. The DMA explains the identification process of material aspects and is therefore crucial for the entire reporting process. It. It also shows the context of the evaluated aspect. The DMA can be distinguished between the Generic DMA and the Aspect-Specific DMA. The Generic DMA provides information on the general management approach, which is applied to any aspect. The Aspect-Specific DMA is further customized to the individual aspects. The G4 provides guidance on the creation of Generic DMA and partly of Aspect-Specific DMA, however, not on all of the Aspect-Specific DMA (GRI 2015b).

Every category includes several indicators, which provide information on performance and impacts. The environmental category encompasses the 12 aspects: Materials, Energy, Water, Biodiversity, Emissions, Effluents and Waste, Products and Services,

Compliance, Transport, Overall, Supplier Environmental Assessment and Environmental Grievance Mechanism. Table 1 gives a detailed overview on the environmental category and its categories.

Table 1: Category Environment of the GRI G4 Content Index (GRI 2015b)

Aspect/ EN	Material	Aspect/ EN	Energy
EN1	Material used by weight or volume	EN3	Energy consumption within the organization
EN2	Percentage of material used that are recycled	EN4	Energy consumption outside of the organization
		EN5	Energy intensity
		EN6	Reduction of energy consumption
		EN7	Reductions in energy requirements of products and services
Aspect/ EN	**Water**	**Aspect/ EN**	**Biodiversity**
EN8	Total water withdrawal by source	EN11	Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas
EN9	Water sources significantly affected by withdrawal of water	EN12	Description of significant impacts of activities, products, and services on biodiversity in protected areas of high biodiversity value outside protected areas
EN10	Percentage and total volume of water recycled and reused	EN13	Habitats protected or restored
		EN14	Total number of IUCN Red List species and national conservation list species with habitats in areas affected by operations, by level, by level of extinction risk
Aspect/ EN	**Emissions**	**Aspect/ EN**	**Effluents and Waste**
EN15	Direct GHG emissions (scope1)	EN22	Total water discharge by quality and destination
EN16	Energy indirect GHG emissions (scope 2)	EN23	Total weight of waste by type and disposal method
EN17	Other indirect GHG emissions (scope 3)	EN24	Total number and volume of significant spills
EN18	GHG emissions intensity	EN25	Weight of transported, imported, exported, or treated waste deemed hazardous under the terms of the Basel Convention Annex I, II, III, and VIII, and percentage of transported waste shipped internationally

EN19	Reduction of GHG emissions	EN26	Identify, size, protected status, and biodiversity value of water bodies and related habitats significantly affected by the organization's discharges of water and runoff
EN20	Emissions of ozone-depleting substances (ODS)		
EN21	NOx, SOx, and other significant air emissions		
Aspect/ EN	**Products and Services**	**Aspect/ EN**	**Compliance**
EN27	Extent of impact mitigation of environmental impacts of products and services	EN29	Monetary value of significant fines and total number of non-monetary sanctions for non-compliance with environmental laws and regulations
EN28	Percentage of products sold and their packaging materials that are reclaimed by category		
Aspect/ EN	**Transport**	**Aspect/ EN**	**Overall**
EN30	Significant environmental impacts of transporting products and other goods and materials for the organization's operations, and transporting members of the workforce	EN31	Total environmental protection expenditures and investments by type
Aspect/ EN	**Supplier Environmental Assessment**	**Aspect/ EN**	**Environmental Grievance Mechanisms**
EN32	Percentage of new suppliers that were screened using environmental criteria	EN34	Number of grievances about environmental impacts filed, addressed, and resolved through formal grievance mechanisms
EN33	Significant actual and potential negative environmental impacts in the supply chain and actions taken		

This is the current status of the GRI G4 Guidelines. Nonetheless, there have been done major changes compared to its predecessor, the GRI G3.1. First of all the G4 consists of two documents instead of one document of the G3.1. However, the main content-related changes concern a stronger focus on materiality including all its implications, application levels, the introduction of the GRI Index, the harmonization with other international frameworks and the compatibility with other principles or standards as well as the development of the XBRL taxonomy. The materiality principle constitutes the heart of the G4. This shift of focus has consequences on many essential areas of the standards such as the scope of the report. Within the G4, reporting companies not only have more flexibility in choosing the focal point of their report, but also in determining the scope of the report. This implies that the revised concept of materiality allows more freedom regarding reporting boundaries, which have to be defined for every material aspect. A materiality dependent reporting boundary concept has the consequence that the impacts along the whole supply chain have to be taken into account, which contributes to sustainable development. Furthermore, the information on abidance with the Guidelines follows a new concept. The G4 replaces the self-declared ranking system, which ranged from A to C depending on the level of application, with the choice of being in accordance with the core or the comprehensive option. In addition, the introduction of the GRI Index is essential. The clear communication of external assurance of different parts of the report is also given within the Index. Moreover, the G4 explicitly underlines collaborations and linkages with other international frameworks such as the UNGC, the OECD Guidelines, the SDGs as well as Integrated Reporting in general. Also the XBRL taxonomy, which is compatible with the G4 was introduced, but is not relevant for the purposes of this thesis (Seele and Wagner 2016).

3.3. The GRI in Partnership with other International Frameworks

The GRI started to establish partnerships with other international frameworks in 2006, roughly six years after its publication. The first step of a broad network of relationships was the linkage of the GRI with the UNGC 2000, which sets out 10 principles targeted mainly to companies on how to conduct their business. These principles encompass the areas Human Rights, Labour, Environment and Anti-Corruption. Principles 7, 8 and 9 are attributed to the environment, which respectively underline the importance of a company to firstly to comply with the precautionary approach when it comes to

environmental issues, secondly to introduce initiatives to enhance environmental responsibility and thirdly to push the development and dissemination of environmentally friendly technologies (UNGC 2017).

In addition, the G4 mentions its relationship to the OECD Guidelines for Multinational Enterprises. Section V of the guidelines addresses environmental protection and sustainable development (GRI 2015b; OECD 2008). Furthermore, the G4 encompasses a chapter explaining its association with the UN Guiding Principles on Business and Human Rights from 2011 (GRI 2015b). After the development of the SDGs, which build on their predecessor, the Millennium Goals, the GRI also established a relationship with them. The GRI sees itself as some sort of bridge connecting companies with governments by enabling them to positively contribute to the achievement of the SDGs. Thus, the GRI partnered up with the UNGC to start an initiative where companies report on their contribution to the SDGs. They can do this by creating their reports according to the GRI Standards (GRI 2017b GRI, UNGC, and wbcsd 2016). Due to the significance of the SDGs nationally and internationally, I describe this linkage in more detail. Table 2 illustrates a summary the specific environmental indicators corresponding to the respective SDG. Out of the 12 environmental aspects, primarily Materials, Energy, Water, Biodiversity, Emissions, Effluents and Waste as well as Compliance are associated with the goals 3, 6, 7, 8, 11, 14, 15 and 16.

Reporting on the environmental indicators of the aspects emissions as well as effluents and waste contribute to the achievement of goal 3, good health and well-being. Moreover, a magnitude of environmental aspects supports goal 6, ensuring availability and sustainable management of water and sanitation for all. These aspects are water, biodiversity, emissions, effluents and waste. Reporting on the indicators from the energy aspect benefits the achievement of goal 7, ensuring access to affordable, reliable sustainable and modern energy for all. Especially, measures for energy efficiency in general and energy efficiency of products have a significant impact. Furthermore, goal 8, promoting sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all, is essential for achieving sustainable development. Companies can contribute to this goal by reporting on the aspects materials, energy and water (GRI, UNGC, and wbcsd 2016). As table 2 shows, reporting on environmental

aspects has a big potential of contributing to goal 11, making cities and human settlements inclusive, safe, resilient and sustainable. The sustainable use of materials, energy and water make cities and human settlements sustainable. Furthermore the minimization of emissions, effluents and waste and therefore environmental compliance support goal 11. The same is true for goal 12, ensuring sustainable consumption and production patterns water (GRI, UNGC, and wbcsd 2016).

In order to ensure a safe environment also for future generations, countries and companies must take urgent action to combat climate change and its impacts, as expressed in goal 13 of the SDGs, life below water. Activities that have an impact on water, biodiversity, emissions, effluents and waste also have an impact on life below water. Goal 14 aims to conserve and sustainably use the oceans, seas and marine resources for sustainable development. As much life below water matters, also life on land plays an essential role. Thus, goal 15 targets to protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss. Corporate performance having an impact on biodiversity and causing emissions, effluents and waste influences the achievement of this goal. Furthermore, environmental compliance is connected to goal 15. Closing up, the environmental section of the GRI also contributes to the achievement of goal 16 via transparency of environmental compliance. Goal 16 of the SDGs is to promote peaceful and inclusive societies for sustainable development provide access to justice for all and build effective, accountable and inclusive institutions at all levels (GRI, UNGC, wbcsd 2016).

Table 2: Linkages of the SDGs and environmental indicators of the environmental category of the GRI Content Index (GRI, UNGC, and wbcsd 2016)

3 GOOD HEALTH AND WELL-BEING	6 CLEAN WATER AND SANITATION	7 AFFORDABLE AND CLEAN ENERGY	8 DECENT WORK AND ECONOMIC GROWTH	11 SUSTAINABLE CITIES AND COMMUNITIES
Emissions EN 15,16,17, 20,21	Water EN 8,9,10	Energy EN 3,4,5,6,7	Materials EN 1,2	Materials EN 1,2
Effluents and Waste EN 22,23,34,25	Biodiversity EN 11,12,13,14		Energy EN 3,4,5,6,7	Energy EN 3,4,5,6,7
	Emissions EN 15,16,17, 20,21		Water EN 10	Water EN 10
	Effluents and Waste EN 22,23,34,25			Emissions EN 15,16,17,18,19, 20,21
				Effluents and Waste EN 22,23,24,25,26
				Environmental Compliance EN 29

12 RESPONSIBLE CONSUMPTION AND PRODUCTION	13 CLIMATE ACTION	14 LIFE BELOW WATER	15 LIFE ON LAND	16 PEACE, JUSTICE AND STRONG INSTITUTIONS
Materials EN 1,2	Energy EN 3,4,5,6,7	Water EN 8,9,10	Biodiversity EN 11,12,13,14	Environmental Compliance EN 29
Energy EN 3,4,5,6,7	Emissions EN 15,16,17,18,19, 20,21	Biodiversity EN 11,12,13,14	Emissions EN 15,16,17, 20,21	
Water EN 10	Effluents and Waste EN 22,23,34,25	Emissions EN 15,16,17, 20,21	Effluents and Waste EN 22,23,24,25,26	
Emissions EN 15,16,17, 20,21	Environmental Compliance EN 29	Effluents and Waste EN 22,23,24,25,26	Environmental Compliance EN 29	
Effluents and Waste EN 22,23,34,25				
Environmental Compliance EN 29				

However, these partnerships and relationships are reciprocal. The OECD Committee on International Investment and Multinational Enterprises as well as the ISO 26,000 Sustainability Management Standard recommend companies to report according to the GRI Standards (Levy, Brown, and De Jong 2009). Furthermore, and probably more importantly from a legal perspective, the EU 2014/95/EU encourages companies to follow the model of the GRI Standards in their reports. In other words, following the GRI Standards in reporting facilitates the compliance with the Directive tremendously. This EU Directive amended its predecessor, Directive 2013/34/EU on disclosure of non-financial and diversity information by certain large companies (EU Directive on NFR) and entered into force in the end of 2014. From then on, the Member States were granted a 2-year transition phase for implementing the Directive on NFR in their national legislation (European Parliament and Council of the EU 2014). Austria implemented the Directive in national legislation via the "Nachhaltigkeits- und Diversitätsverbesserungsgesetz (NaDiVeG)" (Bundesministerium für Justiz 2017).

However, the EU Directive on NFR does not only promote the GRI Standards, but also other international frameworks. Moreover, the EU Directive on NFR is only applicable to companies with more than 500 employees that are categorized as Public Interest Entities. It aims at enhancing transparency, but also accountability of companies (European Parliament and Council of the EU 2014).

3.4. Criticism and Discussion

Until now the GRI has published four generations of reporting Guidelines and the GRI Standards, each with developments and improvements compared to the other. However, like always in academia and corporate life, also aspects of the GRI are criticized by various stakeholders. The GRI tries to respond to these critique points with continuous updates and profound stakeholder involvement in their creation process. Nevertheless, it has not managed to adequately respond to each critique point and to abolish criticism completely (Boiral and Henri 2015; GRI 2017c; Levy, Brown, and De Jong 2009; McElroy 2013; Seele and Wagner 2016; Tuxworth 2013).

From the beginning of the GRI's establishment on there has been criticism regarding the flexibility and the freedom of companies in drafting their report and still be in accordance with the GRI Guidelines (Bennett, James, and Klinkers 1999; Seele and

Wagner 2016). Even after the introduction of the G4 and the GRI Standards this concern holds. While previous generations have counteracted this critique point, the G4 is seen to be a step backwards due to a further loosening of freedom. It is stated that the principle of materiality results in too little standardization even though the updates intend to achieve more standardization. Thus, two key essential features expected from the GRI, comparability and standardization are put into perspective. From their point of view, comparable reporting becomes impossible without providing a profound and credible basis for standardization (McElroy 2013; McElroy and Thomas 2015; Seele and Wagner 2016; Tuxworth 2013).

Altogether, it can be said that the G4 did not completely bring the wanted structural change, even though it resulted in many improvements compared to the previous generations (Seele and Wagner 2016). These improvements are described in more detail in section 3.2. However, the question arises, *why the GRI has failed to adequately respond to the criticism of providing too much flexibility in reporting and thus resulting in too little standardization?* In order to answer this question, one must see the context in which the GRI is embedded as a whole and its development over time, which is elaborated in the sections 3.1. and 3.2. A major goal of the GRI is to achieve a uniform standard of reporting resulting in sufficient comparability and credibility. Despite this goal, the GRI has from its formation on been in a struggle of attracting an audience and keeping it. It strives to expand the number of companies and organizations, who report according to the GRI Guidelines and Standards. Nonetheless, before going into depth of answering this question, it has to be pointed out that this specific criticism mainly comes from the side of external stakeholders rather than the companies themselves (Bennett, James, and Klinkers 1999; Boiral and Henri 2015; Levy, Brown, and De Jong 2009, McElroy 2013; McElroy and Thomas 2015; Seele and Wagner 2016; Tuxworth 2013).

However, the GRI also finds itself in a conflict between satisfying their customer's needs and still providing a reliable framework for uniform and comparable reporting. In order to be applicable to a large number of companies, it is forced to take the individual fields of action of companies into account. Due to the existence of greatly differing sectors, a 100% standardized framework for all companies is not feasible and also not appropriate. However, the adjustment of the GRI framework favoring one of these aspects would most likely disadvantage the other. On the one hand, dictating companies

and organizations on how exactly to report on each aspect in a stringent and uniform way would not result in a very effective standard. Each sector, industry, even each single company has individual characteristics that need special attention and must be taken into account. The GRI does not have the means to do that by itself. However, it is also not its intention. Furthermore, probably less companies would be willing to follow the guidelines of the GRI under such circumstances, which would enhance inefficiency (Mosher, Smith, and Wicker 2014; Seele and Wagner 2016).

On the other hand, letting the companies and organizations freely choose on their own on which aspects to report – keeping their own advantages or disadvantages out of mind – undermines comparability and reliability of the reports. Thus, the GRI finds itself in a quandary of opinions resulting in the development of new compromises or combinations as e.g. expressed in the shift of focus to materiality in the G4. However, the GRI tries to counterbalance the consequences of such a strong materiality principle with a higher requirement on transparency. Extensive disclosure requirements of the management approach and also the disclosure of the determination-process of material aspects should guarantee more transparency and reliability (Mosher, Smith, and Wicker 2014; Seele and Wagner 2016).

Be that as it may, the answer to the question is more far-reaching than it initially suggests and opens the door to the discussion on mandatory versus voluntary environmental reporting. However, an essential feature of the GRI is that it functions on a voluntary basis. No company is legally obliged to apply the GRI Guidelines or the GRI Standards. Shifting to a stringent mandatory framework would come with a number of questionable consequences, which may or may not have a contrary effect on the initial purpose of environmental reporting (King et al. 2010).

The share of voluntary environmental instruments has decreased in the time period from 2006 until 2013. From 2013 until 2016 it rose again. Contrary, the share of mandatory environmental reporting instruments have increased from 2003 to 2013 and decreased again from 2013 to 2016. Therefore, overall voluntary environmental reporting instruments have gone down while mandatory environmental reporting instruments have increased within the last ten years. In other words, environmental reporting has shifted from a more voluntary framework to a more mandatory framework. However,

both approaches come with advantages and disadvantages (Bartels et al. 2017; King et al. 2010).

Voluntary incentives for environmental reporting most likely result in higher quality of the report content. If companies decide themselves that they want to apply certain guidelines or regulations, these reasons also drive the quality of the report. The company itself benefits from the correctness of the reported indicators and thus even drives improvements of environmental reporting frameworks. On the other hand, mandatory environmental reporting leads to more standardization and comparability. However, it seems irrational to force comparability on something that is simply not comparable. Nonetheless, one must bear in mind that having one and the same regulation is not suitable for all companies and organizations. In this regard, a combination of basic mandatory rules and further voluntary environmental reporting is suggested as a compromise (Bartels et al. 2017; King et al. 2010).

The issue of compliance is a more ambiguous one. One could argue that compliance is no issue with voluntary environmental reporting because if a company decides to prepare a report according to certain guidelines or standards, it will also comply with them. However, there are no imposed assurance mechanisms or legal consequences. This is different for mandatory environmental reporting, where there could be legal consequences in case of non-compliance. However, comparison of compliance within a voluntary and a mandatory framework is an evaluation of intrinsic and extrinsic incentives.

Be that as it may, the most discussed aspects in that debate are the effects on global competitiveness on the free market. Opinions in academia vary from arguments that mandatory regulation has only negligible impact on international competitiveness, that it has clear negative effects on productivity to the statement that it increases competitiveness on the international free market (Dechezleprêtre and Sato 2014; Willis 2005; Greenstone, List, and Syverson 2012). The argument of negligible impacts of mandatory regulation on market competitiveness relates to the international regulatory framework from 2014. It claims that the benefits resulting from environmental reporting – regardless of mandatory or voluntary – predominate the negative impacts. These benefits are e.g. expressed by efficiency increases, which would lead to the possibility

to provide products and services to lower costs. This argument can be brought to another level by saying that mandatory environmental reporting even has a positive impact on global competitiveness by stimulating innovations in the sector of green technologies (Dechezleprêtre and Sato 2014).

On the other hand, a study of researchers in the US has shown that mandatory environmental regulations have resulted in a decrease of productivity of several manufacturing companies in the US. This decrease in productivity leads to a disadvantage on the global market (Greenstone, List, and Syverson 2012). However, it becomes clear that this debate is a highly complex one. While all of these arguments might be true, no confident statement can be made about the net effect. Nevertheless, it can probably be also agreed on the fact that environmental reporting is expensive. The cost factor might not be a problem for large companies; however, it can be a big burden for smaller companies. Therefore, before introducing legal requirements for environmental reporting is always connected to a balance between the questions of how much the legislation wants to show considerations for those companies and how much they can be further burdened. Furthermore, it is questionable whether forcing environmental reporting on companies misses the nature of its purpose or not and whether the benefits resulting from environmental reporting could also be achieved with a voluntary approach.

Another complaint about the G4 is the accusation that it does not provide enough details on the principle of sustainability context. This aspect addresses the statement that the reported environmental impacts must be put in relation with ecological thresholds (McElroy and Thomas 2015). Without such sustainability context the result of the reports are inconclusive. Even though this principle exists in the G4, it fails to provide guidance on how to provide a sustainability context (McElroy 2013). However, I believe that this complaint is applicable to some degree but on the other hand, one has to keep in mind that also this aspect cannot be looked at without considering another sensitive issue, namely complexity, into account. A broader, more sustainable context of the reported impacts adds to the already existing complexity and magnitude of reports. This leads to the next highly discussed shortcoming of the GRI. Criticisers claim that the G4 under the GRI has become too complex and extensive, which could

represent a barrier to transparency of a report but also to non-application of the G4 Guidelines (McElroy 2013; Mosher, Smith, and Wicker 2014; Tuxworth 2013).

Here again, the GRI seems to find itself in a conflict regarding the balancing of two different deficiencies. In order to provide a framework for comprehensive, more realistic reporting the GRI has to expand the necessary content of a report and its context. Consequently, the complexity and the burden of preparing such a report in accordance to the standards increases. Not all companies have the financial resources and the human resources to do so. Thus, it could either lead to an exclusion of smaller organizations and companies or to the preparation of not qualitative reports due to a lack of resources. Furthermore, this could also result in the exclusion of stakeholders that want to read and understand the report who do not have a certain education in the field.

In connection with this critique point comes the next concern in combination with the GRI. Since the G4, including its credibility, relies on materiality, the question comes up on who decides which aspects are material and which are not (McElroy 2013; McElroy and Thomas 2015; Tuxworth 2013). The first thought probably leads to the person who is responsible for sustainability in the company. The capability of this person to do so it yet questionable. It seems that the G4 tries to counteract this concern with the G4 exam, which consists of 60 multiple choice questions on the G4. Those questions have to be answered within 1,5 hours. If at least 45 are answered correctly, the respective candidate receives a certificate and its name is listed on the website of the GRI for three years. However, the candidates have to attend one of Certified Training Courses or Training Modules offered by the GRI before being allowed to the exam. In addition, the GRI provides for several online resources and guides to sustainability reporters. Nevertheless, the GRI does not require them to make use of them or to complete the examination (GRI 2017a).

Generally, the G4 recommends external assurance but it is not a requirement to undergo such external assurance in order to be in accordance with the core or the comprehensive option. Nonetheless, even if all the reporting companies follow the recommendation and provide external assurance, there is no recommended uniform verification standard. Thus, different external assurance can mean different things (Townsend, Bartels, and Renaut 2010). However, this seems like an issue, which can be overcome rather easily

by providing some sort of criteria catalogue, which external assurers should include in their assurance process.

3.5. Conclusions

The four generational updates of the GRI and the development of new standards illustrate that the framework of environmental reporting is a dynamic process. Such dynamic process is necessary in order to respond to changing circumstances and especially in order to improve the framework for environmental reporting. *What are the current trends of the GRI and environmental reporting in general?* Within the last 10 years, environmental reporting has moved away from voluntariness towards obligation. The legal framework for environmental reporting has changed in a way that requires disclosure of corporate action on the environment in a more stringent way. The consequences of this change and whether they miss the initial goal of environmental reporting are open for debate.

However, a company can freely decide which framework to use for the drafting of its environmental report as long as the framework is recognized by the respective legislation. In the case of Austria, this applies to the GRI Guidelines and Standards, which still constitute the prevailing frameworks internationally (Bartels et al. 2017; Seele and Wagner 2016). Several international institutions such as the UNGC, the OECD Committee on International Investment and Multinational Enterprises as well as the ISO support the application of the GRI (Levy, Brown, and De Jong 2009). Furthermore, also environmental think tanks and NGOs, such as SustainAbility, encourage companies to follow the standards of the GRI (Mosher, Smith, and Wicker 2014). In addition, the GRI points out its connection and its contribution to reaching the SDGs (GRI, UNGC, and wbcsd 2016). These efforts illustrate the strive of the GRI towards partnering up with other internationally recognized institutions to ultimately also strengthen the GRI itself.

However, the evolvement of the IIRC and the SASB, indicate a slight trend towards an increase in the number of reporting frameworks (Bartels et al. 2017). This emergence of new environmental reporting frameworks suggests that the GRI did not manage to satisfy the needs of all stakeholders, which means that it failed to fill the niche of

providing a uniform standard. Be that as it may, the GRI continues to follow the strategy of partnering up with other frameworks and to steer towards a simultaneous application of multiple frameworks. This is especially true for Sustainability Reporting and Integrated Reporting, which leads to a further strengthening of the GRI instead of a weakening due to new frameworks.

The request for Integrated Reporting is expanding gradually. Especially the discussion paper of the IIRC, which was published in 2011, had significant influence in that discourse. According to the discussion paper, the separate reports for the economy, the environment and the social sphere have to be merged to one single report in order to accurately take interdependences between the spheres into account. Furthermore, the essential feature of Integrated Reporting is that it provides a broader disclosure context. Despite any development and updates of the GRI, this shift towards one Integrated Report is undeniable (Prajapati, Shibin, and Lad 2011; PwC 2011). This movement is especially important since an isolated view of the three categories does not depict the reality and the dynamics, which we face nowadays. The GRI recognizes this development and explicitly underlines its connection to Integrated Reporting in the G4. However, it also points out that the application of IIRC framework or Integrated Reporting in general should not compromise or replace the application of the GRI Guidelines or Standards. If a company chooses to prepare an Integrated Report and a Sustainability Report, the interconnection between the two should be done by making remarks on the Sustainability Report (and the GRI Index) on where the respective information is to be found in the Integrated Report. By doing so, the GRI wants to avoid overlaps, which results in double effort and expenses. In case it decides to prepare an Integrated Report only, it should apply the GRI Guidelines or Standards in order to ensure sustainable reporting (GRI 2015b).

Furthermore, the environmental reporting steers towards more room for maneuver for companies. This leeway for reporters is the result of the stronger focus on materiality within all frameworks. Within the defined materiality principle, companies determine themselves, which aspects are significant for their field of action. Nonetheless, currently the concrete definition of materiality is not the same in the different frameworks (Mosher, Smith, and Wicker 2014). Another clear trend is that environmental reporting frameworks including the GRI emphasize the benefits of reporting for companies

themselves and their stakeholders. They stress the importance of qualitative reporting in order to be able to make informed strategic decisions. By laying down the advantages, they try to incentivize companies to create comprehensive reports following the given standards.

While this depicts the current status of environmental reporting and the GRI, the endeavors must not stop there. *What are the presumable future developments of environmental reporting and what are their consequences on the GRI?* One can see that environmental reporting frameworks follow an approach of compatibility with other international frameworks of reporting rather than a concurrence approach. In other words, they encourage a parallel application of frameworks rather than an exclusion based approach. However, in order to move forwards this will most likely not be sufficient. In order to not register losses of followers, there must be a shift from compatibility to complementarity so that e.g. Integrated Reporting sets an incentive for also preparing a Sustainability Report and vice versa. This is especially true since Integrated Reporting increasingly gains prominence. There is an unequivocal trend towards the creation of one single report taking the interactions between the categories into account. This trend will most likely continue to grow in the future. Thus, the GRI must find a way to participate in that trend without compromising its own Standards. It already does so by supporting Integrated Reporting by pointing out its compatibility. However, probably in the future it will underline the complementarity more by arguing that Sustainability Reporting must be done together with Integrated Reporting in order to be meaningful instead of only advocating its inclusion. If the GRI fails to convince companies that reporting only has a solid meaning when Sustainability Reporting is incorporated in Integrated Reporting, it raises its chances of losing its pioneering role in reporting. Furthermore, this incorporation enhances environmental reporting in general since such comprehensive complementary report is more suitable of displaying a realistic picture. Thus, stakeholders are better informed and have a better basis for decision-making and optimizing processes.

Members of SustainAbility predict that in the long run it is necessary to arrive at only one materiality instead of different ones as at the moment expressed by the IIRC, SASB and the GRI (Mosher, Smith, and Wicker 2014). This underlines the prerequisite of the GRI to move towards complementarity with the other frameworks. Remaining

definitions that greatly differ from each other could even push the advancement to compatibility back again and result in a too high burden to report in accordance to all of these standards. Thus, probably also the GRI would lose some of its followers. Moreover, the GRI needs to respond adequately to the complexity and reliability issue. As explained above, addressing these concerns is always connected to some sort of trade-off. It is crucial for the GRI to find a solution without compromising any of the aspects. In this context, there also has to be a satisfactory balance between the needs of individual companies and the same time the insurance of a uniform standard.

When it comes to external assurance of reports, there will most likely also be some changes. In the future, external assurance has to be standardized. In other words, external assurers have to conduct their assurance process according to the same rules. Thus, external assurance by different assurers has the same quality and the same meaning. Ideally, the GRI sets up a mechanism to verify that the granted assurance is meaningful. Such a mechanism could for instance be expressed through a content checklist of external assurers. The GRI could work together with external assurers to create a uniform assurance process for environmental reports that is in accordance with the GRI Standards. Otherwise, the GRI could recommend a specific external assurer. Thus, a uniform assurance system would be established, which contributes to the quality of comparability (if comparable) and reliability. Another effect of such uniform assurance system could be that the companies could get rid of green-washing accusations.

Furthermore, the GRI must also improve internal assurance. I believe that the G4 examination as it is now is not suitable to evaluate the competency of a person to prepare a report according to the Guidelines. The GRI has to change the concept of the GRI examination away from a multiple-choice test towards a more case study related evaluation. When being put in the context of a fictive Sustainability Report, the respective reporters can show their capability of preparing a report in a more realistic way. This is crucial for creating a qualitative report. Not only for the reputation of the company, the GRI or the report itself, but because corporate decisions are based on information provided in this report.

4. Case Study: Comparative Analysis

The case study represents a practical approach to the investigation of the current status and the future of environmental reporting. On the one hand the conclusions of the comparative analysis underline the statements made in the theoretic section and on the other hand they add another perspective to them. This case study covers the environmental category of the reports of four different companies. The basis for the selection of the companies is explained in detail in the methodology. This section includes an introduction of the companies, which consists of the field of activity of the company and some general facts. Subsequently, the comparative analysis follows a four-step approach. The sequence of the steps is firstly a comparison of the individual materiality analyzes, secondly a comparison of the scopes of environmental reporting, thirdly a content analysis of the report and lastly, an analysis of the different approaches and attitudes towards environmental reporting. Ultimately, conclusions of the case study are drawn.

The comparative analysis is based in the environmental category of GRI Index of the four companies VERBUND AG, OMV AG, Wienerberger AG and Palfinger AG. Thus, the GRI content Index from the reports of each company is used as a starting point. The GRI Index is a clearly structured content overview of the prepared report. It is divided in the three categories economy, environment and social. Each category is sub-divided into aspects and each aspect includes one or a set of indicators. Companies that prepare their report in accordance with the core option of the G4 must report on at least one indicator for each material aspect. The environmental category contains 34 Performance Indicators (PI), noted as EN1 – EN34, which are illustrated in more detail in table 1. Moreover, the GRI Index includes the page number and/or the specific section on where the respective disclosures of the indicators are to be found. Thus, it is very helpful for orientation and a quick navigation to the reported indicators. In addition, it provides information on omitted disclosures including a recognized reason of the GRI for omission. The most recent update of GRI Index also allows further information to be noted in the Index. Firstly, the name of the Indicator can be added. Secondly, additional columns can be created, which give information on the compliance with reporting frameworks other than the GRI. Nevertheless, this can only be done if it is put in the end of the Index after the three core columns in order to maintain the structure of the content Index. A further prerequisite is that additional information does not irritate the

reader. However, these further information is not relevant for this case study (GRI 2015a).

4.1. Presentation of the Companies

The four analyzed companies are VERBUND AG, OMV AG, Palfinger AG and Wienerberger AG. The companies vary in size, which is expressed in revenues, people employed, in the scope of their international activities as well as in their relationship to environmental reporting. The first two operate in the energy sector, the other two in the construction sector. However, they occupy different fields also within the same sector.

With 93% renewable energy, the **VERBUND group** is the largest renewable energy supplier in Austria and has its headquarter in Vienna. Despite its origin and market dominance in Austria, VERBUND operates throughout Europe employing almost 3.000 employees in 2016. More than 80% of VERBUND's electricity production is generated from hydropower, in which field it is also one of the leading players in Europe. Thus, VERBUND's guiding principle is to provide environmentally friendly and energy efficient power from renewable sources to produce hydropower, thermal power, wind power and solar energy. In the late 1950ies, when VERBUND was founded, the Austrian government had difficulties in providing sufficient electricity to companies and people. Thus, the Austrian government commissioned VERBUND to re-establish and to broaden the electricity infrastructure in Austria. By now, the VERBUND group has grown tremendously by having several different business relationships as well as subsidiaries and shareholdings all across Europe (VERBUND 2017b, 2016b, 2017a).

Environmental protection is one of the top priorities of VERBUND. It was one of the first Austrian companies who prepared an environmental report, which then in the course of time transformed into Sustainability Reports. Since 2015, VERBUND integrates sustainable reporting in their Integrated Annual Report, which has become the main reporting document. In addition to the Integrated Annual Report, some information is to be found in separate documents – the DMA document and the Extra Document (EDO), which are also consulted for the comparative analysis (VERBUND 2016b).

Also **OMV AG** has its headquarter in Vienna and is a large international enterprise in the energy sector, which originated as state owned company. The abbreviation OMV stands for „Österreichische Mineralölverwaltung Aktiengesellschaft“. In contrast to VERBUND with 3.000 employees, OMV employs around 24.000 employees all over the world. Furthermore, a significant distinction is that OMV operates in conventional energy generation with oil and gas. Nevertheless, according to its website, OMV orients itself on the principle of “resourcefulness”, which puts its emphasis on sustainable and responsible but profitable growth. One of the enterprise’s main focuses is also to communicate its environmental consciousness and its efforts in improving its environmental performance (OMV 2016a, 2017a, 2017b).

Instead of preparing an Integrated Annual Report taking into the standards for sustainable reporting into account, the OMV prepares a Sustainability Report and an Annual Report. Since the Sustainability Report of 2015 does not include the GRI Content Index, there is an extra document of it. The environmental category of the GRI Index only refers to the Sustainability Report and not to the Annual Report, which is why only the GRI Index and the Sustainability Report is used as basis for the comparative analysis (OMV 2016c, 2016b, 2017b).

Palfinger AG is an international Austrian group, which originated in Oberösterreich in 1932 and has its headquarter in Salzburg. The company produces hydraulic loading devices, hydraulic lifting devices and special cranes for trucks. Palfinger is with its around 8.000 employees a major global player in the sector of mechanical engineering and global leader with the special crane for trucks with articulated arm. The company comprises several manufacturing and assembly sites all over the world (Palfinger 2016, 2017a)

The first Sustainability Report by Palfinger was published in 2003/2004, which was replaced by its first Integrated Annual Report in 2013. The Integrated Annual Report 2015 includes a section of detailed sustainability disclosures. Furthermore, Palfinger prepares a UNGC progress report, to which the environmental category of the GRI Index refers (Palfinger 2017a, 2017b). However, all the relevant information for this case study can be found in the Integrated Annual Report.

The Austrian company **Wienerberger AG** is one of the biggest provider of building material and the largest provider of bricks in the world. Besides bricks, it has tiles and ceramic as well as concrete pavers and pipe systems within its product line. Wienerberger was founded in 1819 in the South of Vienna, where it still has its headquarter, but has tremendously expanded since then. Today it employs roughly 16.000 employers in around 200 production sites all over the world (Wienerberger 2016a, 2017a).

According to the website of Wienerberger, Sustainability is an integral element of its corporate action. In addition to an Annual Report, Wienerberger currently prepares a Sustainability Update for 2015, which supplements the Sustainability Report of 2014. Furthermore, it compiles a Sustainability Roadmap for 2020 (Wienerberger 2017a). However, only the Sustainability Report and its update for 2015 are being used for the analysis since all the analysis-relevant information can be found there.

4.2. Comparative Analysis of the Reports

The overall comparative analysis of the company reports focuses on environmental reporting of the companies. It investigates to what degree the environmental side of the reports is comparable and what are possible obstacles to comparability. Furthermore, these obstacles are briefly discussed in order to make conclusions on how easy or how difficult it is to overcome these obstacles. Moreover, the comparative analysis aims to make statements about the approach and influence of the different sectors or sub-sectors to environmental reporting.

The comparative analysis is conducted in a 4-step process. The first step is the comparison of the individual materiality analyses of the companies. This materiality analyses comprise the top 10 as material identified topics and all the material topics that are related to the environment. In other words, the first 10 material topics also include topics concerning the economic and the social sphere. Starting from the 11th material topic, the remaining environment-related material topics are listed. The juxtaposition of those materiality analyses makes it possible to derive common features and differing points of significance within and between the two sectors.

The second step is related to the first step and thus to the individual material topics. It describes the scope of environmental reporting of the four companies based on the environmental category of the GRI Index. The companies are obliged to report on at least one indicator for each identified material aspect in order to be in accordance with the core option of the G4. For the most part, this is the case when reviewing the material topics and the scope of reporting together. However, the analysis also discovers a few discrepancies and uncertainties. Be that as it may, companies are encouraged to report on all relevant indicators to each material aspect if possible. The comparison of the scope reveals different application types of the G4 core option in terms of the amount of reported indicators.

Consequently, the third step rather represents an attempt of a comparative analysis of the report content than an actual comparison. This attempt explains on the basis of two environmental aspects why a profound content comparison of the reports is not possible and not expedient. It demonstrates the obstacles and discusses them briefly. Lastly, the approach and attitude of the four companies towards environmental reporting is derived based on the company-histories of environmental reporting of the individual companies and based on the first three steps.

4.2.1. Materiality Analysis

Table 3 presents the topics considered as material by companies according to the materiality principle laid down in the GRI G4 Guidelines. Those material aspects that refer to environmental indicators within the G4 include a reference to the respective indicator, marked as EN plus the number of the indicator. From 1-10 the material topics are ranked according to their significance to internal and external stakeholders of the respective companies. The other topics are still listed in descending order, however, from topic 10 on only those material topics are considered in the table, which have a relation to an environmental indicator according to the GRI G4 Guidelines. The material topics of Wienerberger follow a slightly different approach. Wienerberger identifies four overarching material areas, which are Environmental aspects in production, Products, Supply chain and raw materials as well as Social aspects in production. The first four identified material topics are ranked as most significant within their area. In other words, Energy efficiency is the most significant aspect when considering environmental aspects in production, Innovative and sustainable products is the most important aspect when thinking of their products. The same principle applies

to the other two of the first four material aspects of Wienerberger. The next four aspects are ranked as second most important within their group. All in all, the first 10 topics of Wienerberger are in general considered the most significant. The following material aspects are only those related to the environment.

The colors indicate the purpose of the aspects. Aspects marked in green are related to climate protection, energy efficiency or concern renewable energy. Aspects marked in grey refer to sustainable materials, resource efficiency and sustainability as well as recycling. Topics concerning emissions and effluents are marked in orange. Red aspects describe health and safety for employees of the companies. Nevertheless, since this comparative analysis focuses on the environment, only material aspects related to the environment are categorized in the table. However, even though there is no remark of an environmental indicator for the aspect health and safety, it is included in the categorization because it also seems to be a highly prioritized aspect all four companies.

The color differentiation helps to see common material aspects of the analyzed companies more clearly. Firstly, it shows that Health and Safety (of employees) is among the very first most important aspects for OMV, Palfinger and Wienerberger. VERBUND ranks Responsibility for employees as eighths. However, it has to be said that the sector of renewable energy is connected with much less danger than the construction sector or the field of OMV, where oil and gas drilling are involved. Secondly, energy efficiency is a commonality of the four companies. VERBUND, OMV and Wienerberger include energy efficiency within the five most significant aspects while Palfinger ranks it as ninth together with climate protection, which leads to the third common ground. Likewise, climate protection or impacts on climate change are within the first five priorities for VERBUND and Wienerberger whereas OMV and Palfinger rank it as eighth and ninth. Furthermore, OMV, Palfinger and Wienerberger include specific material aspects concerning effluents. In contrast to the other two companies, OMV highly prioritizes this aspect and ranks oil spills as second most important. Here again, it must be noted that VERBUND's field of action is barely coupled with harming substances and emissions.

The materiality analyses of Palfinger and Wienerberger are mainly different to those from VERBUND and OMV in respect of materials and emissions. As consequence of

their field of action, Palfinger and Wienerberger identify an efficient use of resources and the avoidance of emissions as a crucial aspect of their reporting. According to the Annual Integrated Report of Palfinger in 2015, they have even gone so far to use electric drives already two years before the publication of the report. Be that as it may, both companies also focus on re-use and recycling as well as on the quality and environment-friendliness of their products. The focus on environment-friendly products can be very well illustrated. For example, Palfinger aims to provide low-weight cranes and the use of biodegradable hydraulic oil, which result in energy efficiency. Wienerberger works on water saving solutions for roofs, which benefits resource efficiency of their customers.

To sum up, the materiality analysis shows differences and similarities between and within the sectors. When viewing the identified material topics, it becomes evident how important it is to have a reliable and accurate materiality analysis. The materiality analysis is the profound basis of the whole report. This means, if this analysis is not done properly, the following report becomes meaningless. Another key thing to remember is that more weight can be attributed to materiality since it is decisive in differentiating between sectors and between individual companies in general. Moreover, the comparison of the identified material aspects of the companies illustrates a slightly different approach. Whereas VERBUND has a more comprehensive understanding of its aspects, the other three go into more detail in the materiality analysis. However, table 4 illustrates that ultimately the scope of VERBUND's environmental reporting is significantly broader than the others, taking into account that it is based on the indicators according to the category environment of the GRI Content Index.

Table 3: Materiality Analysis of VERBUND, OMV, Palfinger and Wienerberger from 2015 (OMV 2016c; Palfinger 2016c; VERBUND 2016a, 2016b; Wienerberger 2016b)

Ranking	VERBUND	OMV	Palfinger	Wienerberger
1	Secure supply of electricity	Health and safety	Health and safety of employees	Energy efficiency EN3-7
2	Increase in enterprise value	Oil spills EN24	Product safety	Innovative and sustainable products EN27
3	Environmental protection and conservation EN11-13, EN1, EN3, EN5,	Security	Viability of the business model	Avoidance of hazardous substances EN25, EN27
4	Climate protection EN3, EN5, EN15-18	Business ethics and corruption	Attractive employment possibility	Health and safety of employees
5	Customer relationships	Energy efficiency EN3-7	Research and development	Climate protection EN15-18
6	Innovation	Regulatroy environment	Raw materials demand and efficiency EN1	Long service-life and long term value
7	Dialogue with stakeholders	Employee attraction, retention and training	Compliance with legal and ethical standards	Availability of clay and loam
8	Responsibility for employees	Impacts of climate change EN15-18	Correct corporate governance	Business ethics and compliance
9	Procurement	Governance	Energy efficiency and climte protection EN3-7 and E15-18	Energy efficiency of buildings EN3-7, EN27
10	Compliance and transparency	Community engagement	Efficient and environmentally friendly products EN27	Staff trainings
11		Water management EN8-10	Products without problematic substances EN23, EN27	Sustainable materials for accessories EN27
12		Renewable Energy EN27, EN15-21	Sustainability in the supply chain EN32, EN33	Recyclability, recycling & re-use of products EN2
13		Unconventional energy sources EN27, EN15-21	Effluents and waste EN23	CO2 emissions from transport of raw materials EN15-19, EN30
14		Biodiversity EN11-14	Product recyclability EN23, EN27	Resource efficiency and waste management EN2, EN22-26
15			Avoidance of noise and emissions EN15-18	Sustainable transport of products EN30
16			Lower product weight EN1	Sparing use of water EN8
17			Biodegradable hydraulic oil EN27	Nature protection and re-use in mining EN2, EN11
18			Alternative power systems EN27	Use of recycling material EN2
19				Packaging efficiency EN1
20				Sustainability during construction & demolition EN27
21				Roof: water saving solutions EN27

4.2.2. Scope of Environmental Reporting

The materiality analysis illustrates those areas of corporate action from the point of view of the different company-stakeholders that have a significant impact on either the economy, the society or the environment. They indicate focal points of companies, which they strive to improve and which have significant impact on their performance. Therefore, qualitative reporting on the respective indicators is necessary. Companies are encouraged to report on all the indicators, which are necessary to take into account for each material aspect. However, the G4 core option only requires reporting on at least one indicator per material aspect (GRI 2015a).

Table 4 shows the different environmental aspects with the corresponding indicators. The information for this table is directly obtained from the GRI Indexes of the companies, which are either published within the Sustainability Reports, Annual Reports or Integrated Annual Reports or published separately. The fields marked with a "✓" point out those indicators, on which the respected companies do report. Blank fields illustrate those indicators, on which the respective company does not report. However, if a company does not report on at least one indicator related to an aspect, this means that it does not consider this aspect as material. Nonetheless, the comparison of the materiality analysis of the companies with the reported indicators and thus the material aspects shows some discrepancies.

VERBUND reports on at least one indicator for every environmental aspect except the aspect of transportation. However, transportation is also not covered by its materiality analysis. Furthermore, VERBUND reports on 30 environmental indicators out of 34 and either considers 11 aspects out of 12 as material or discloses the related information anyways. According to the GRI Index of OMV, it does not consider the aspects materials, products and services, transport as well as supplier and environmental assessment as material. This means that 4 out of 12 environmental aspects are considered as not material. These aspects are also not covered by the materiality analysis of OMV. All in all, OMV discloses 22 environmental indicators out of the 34 provided in the GRI Index. Palfinger does not disclose any indicators of the GRI Index for the aspects water, biodiversity, compliance, transport, overall and grievances. These aspects constitute half of all environmental aspects. Nonetheless, one topic considered as material in Palfinger's materiality analysis is "Compliance with legal and ethical

standards". To sum up, Palfinger reports on 15 environmental indicators out of 34 (OMV 2016b; Palfinger 2016; VERBUND 2016a; Wienerberger 2016b).

In contrast to the other companies, there are more discrepancies between the materiality analysis of Wienerberger and the scope of its environmental reporting covered by its GRI Index. The environmental category of the GRI Index of Wienerberger does not mention the aspects effluents and waste, compliance, transport, overall and grievances. These are 5 out of the 12 aspects. However, the materiality analysis includes the topic "Resource efficiency and waste management". This topic would be related to the category effluents and waste and thus require at least one of the indicators from that aspect. Furthermore, the materiality analysis encompasses the topics "Transport of raw materials" and "Sustainable transport of products", which refer to the category transport. At this point it is necessary to point out that Wienerberger has initiatives to e.g. to decrease specific types of wastes. Nevertheless, this scope analysis focuses on the specific environmental indicators of the GRI Index. A third discrepancy can be found related the aspect compliance due to the fact that Wienerberger identifies "Business ethics and compliance" as material aspect. However, it is possible that compliance in this sense does not refer to environmental compliance. The same is true for Palfinger. Be that as it may, Wienerberger discloses on 11 environmental indicators out of 34 (OMV 2016b; Palfinger 2016; VERBUND 2016a; Wienerberger 2016b).

Table 4: Scope of environmental reporting according to the environmental category of the GRI Content Index 2015 (OMV 2016b, Palfinger 2016, VERBUND 2016b, Wienerberger 2016b)

	VERBUND	OMV	Palfinger	Wienerberger
Materials				
EN1	✓		✓	
EN2	✓			✓
Energy				
EN3	✓	✓	✓	✓
EN4	✓	✓	✓	
EN5	✓	✓	✓	✓
EN6	✓	✓	✓	✓
EN7	✓		✓	
Water				
EN8	✓	✓		✓
EN9	✓			
EN10				
Biodiversity				
EN11	✓			
EN12	✓	✓		
EN13	✓	✓		
EN14	✓			
Emissions				
EN15	✓	✓	✓	✓
EN16	✓	✓	✓	
EN17	✓	✓	✓	
EN18	✓	✓	✓	✓
EN19	✓	✓		✓
EN20	✓	✓		
EN21	✓	✓		
Effluents and Waste				
EN22	✓	✓	✓	
EN23	✓	✓	✓	
EN24	✓	✓		
EN25		✓		
EN26	✓			
Products and Services				
EN27	✓		✓	✓
EN28				
Compliance				
EN29	✓	✓		
Transport				
EN30				
Overall				
EN31	✓	✓		
Supplier and Environment Assessment				
EN32	✓		✓	
EN33	✓		✓	✓
Grievences				
EN34	✓	✓		

4.2.3. Comparative Content Analysis

The comparative analysis of the content of the reports only considers the environmental performance of the companies. I intended to mainly focus on 4 out of the 12 environmental aspects, which serve as benchmark for the analysis. These aspects are emissions, energy, water, as well as effluents and waste. The aim is to make conclusive statements on the environmental performance of the companies and to compare the results. However, after analyzing the results of the aspects emissions and energy, several obstacles become evident. These obstacles already lead to a conclusion on the comparability of the reports and make further investigation of other aspects void.

As a first attempt to collect data, the respective environmental sections of the reports are easily found with the help of the GRI Content Index. However, first difficulties occur due to differing methods of reporting environmental information. The disclosure on greenhouse gas (GHG) emissions measures as CO2 (CO2e) equivalents serve as a suitable example to illustrate this point. First of all, VERBUND and OMV disclose comprehensive information on CO2 equivalents ranging from scope 1 to scope 3. Wienerberger only publishes its direct CO2e, which is scope 1. Scope 2 represents indirect GHG emissions and scope 3 other GHG emissions. Although Palfinger reports on all three scopes, it only considers emissions caused by energy consumption. Thus, a comparison of emissions with Palfinger becomes no longer appropriate. However, one could consider to only comparing scope 1 of the other companies. Taking a deeper look into the numbers, one can see that the emissions of OMV in scope 3 are almost a tenfold of the emissions in scope 1. Therefore a comparison of only scope 1 seems to be misleading (VERBUND 2016a, 2016b; OMV 2016b, 2016c; Palfinger 2016; Wienerberger 2016b).

In conclusion, it can be said that the differing context of the reported information constitutes an obstacle of comparison. The example of Palfinger proves this statement in the framework of this case study. Moreover, the differing amount of disclosed information hinders a comprehensive comparison, illustrated by the example of Wienerberger. An additional barrier was the disclosure of the GHG emissions in different units. However, this barrier can be overcome quite easily. Table 5 visualizes the results of GHG emissions of the four companies to illustrate the explained obstacles.

Table 5: Illustration of the company report's CO2e emissions (Scope 1-3) in different units in 2015 (OMV 2016c, Palfinger 2016, VERBUND 2016b, Wienerberger 2016b)

	VERBUND	OMV	Palfinger*	Wienerberger
CO2e	in kt	in mn t	in t	in t
Scope 1	1.737	11,90	16.789	2.300.574
Scope 2	300	0,4	41.279	n.s.**
Scope 3	284	112	8.513	n.s.**
Total	2.321	124.3	66.581	2.300.574
* emissions caused by primary energy sources				
** not specified				

Besides that, it is questionable how to compare the results, assuming that they are prepared in a way that allows comparison. First of all, it seems pointless to compare the absolute GHG emissions of the companies. Absolute numbers do not take into account eventual additions of production sites or a general expansion in production. They do not consider the size of a company including the geographical scope of operation.

VERBUND solved this problem by putting GHG emissions in relation to electricity produced. For the year 2015 VERBUND caused 74 tons of GHG emissions per GWh of electricity generated. It uses this key figure as basis for future emission reduction goals and measured developments from the past. For 2020 VERBUND plans to decrease this number to 10 tons of GHG per GWh by reaching the goal of producing 100% renewable energy. OMV partitions the total GHG emissions to their cause. Therefore, they disclose that of 124.3 million tons GHG emissions 83.4 tons result from oil to energy, whereas 21.2 million tons result from gas to energy. The remaining GHG emissions are attributed to non-energy production (VERBUND 2016a). Wienerberger provides a detailed breakdown of the direct CO2 emissions for every product in their product line. However, this concerns only CO2 emissions excluding other GHG and goes to deep into detail (Wienerberger 2016b). Palfinger on the other hand, creates an index where it sets the GHG emissions in relationship with the revenues (Palfinger 2016). Again, one has to bear in mind, that only GHG resulting from energy consumption are disclosed in the report. Thus, one could also calculate such an index for the other companies in order to be able to compare the results. Nevertheless, there is no purpose in doing so.

Analyzing the aspect of energy or energy efficiency results in a similar pattern. The disclosure of energy consumption and energy efficiency results is quite similar of the four companies. However, while VERBUND, Palfinger and Wienerberger break down their energy consumption by energy source, OMV only discloses its overall energy consumption. Nonetheless, VERBUND and Palfinger divide the energy sources into coal, oil, natural gas and electricity. Whereas Palfinger also distinguishes between liquefied natural gas, VERBUND also has biomass as an energy source. On the other hand, Wienerberger divides its energy sources in the three sections fuels, heat and electricity, which are then further sub-divided. The units used are GJ by VERBUND and OMV and MWh by Palfinger and Wienerberger (OMV 2016b, 2016c; Palfinger 2016; VERBUND 2016a, 2016b; Wienerberger 2016b). However, one could again make use of the Palfinger's index of relating the total primary energy consumption to revenues. But it does not seem useful to do so.

In conclusion, these examples show on the one hand that a comparison of the results between these companies is not possible. Even if a uniform key number could be created with moderate effort, the information value of this key number is highly restricted. It could make statements of whether a company is emission intensive, energy intensive or waste intensive. Be that as it may, such statement can probably also be made without creating an additional key number. Furthermore, this attempted comparative analysis illustrates that not only a comparison between sectors come with barriers but also comparisons within sectors are difficult to be drawn. One sector can be split in a multitude of sub-sectors. It would probably also not make much sense to compare the results of two provider of renewable energy if the source of energy is different as for instance of a producer of hydropower, solar energy or wind energy. However, it is more likely that comparisons within hydropower producers, solar energy producers and wind energy producers are more conclusive.

In addition, doubts regarding the usefulness of stringent uniform standards for the report content come up. Thus, I come back to the question of *why the GRI has failed to adequately respond to the criticism of providing too much flexibility in reporting and thus resulting in too little standardization.* The principle of materiality is necessary in order to make reporting meaningful. Achieving comparability cannot be the prioritized

goal of environmental performance. More standardization must not be attained by compromising the quality and the meaningfulness of the report. Nonetheless, taking this flexibility away from companies and organizations would firstly result in reports with useless information content. Secondly, it would result in a shallow basis for efficiency improvements of corporate performance. However, one has to bear in mind that this is true for the environmental section of reporting and not reporting as a whole.

4.2.4. Approach and Attitude towards Environmental Reporting among the Industries

The importance of environmental reporting is recognized among the sectors and industries of the analyzed companies. Nevertheless, the approach and the attitude towards environmental reporting vary among them. Firstly, the core business of all four companies is utterly different. Secondly, environmental reporting has a different priority for the individual companies. And thirdly, the application of the G4 core option varies among the companies. *What is the influence of different sectors to environmental reporting?* In this regard it must be said that it lies in the nature of VERBUND's activity to highly consider the environment. Thus, VERBUND clearly has an advantage when reporting on environmental indicators. With oil and gas being the source for energy production of OMV, its relationship to environmental protection is naturally a different one. In this regard, Palfinger and Wienerberger have a more similar position when it comes to the environment. However, what they have in common is that they prepare their reports – thus also the environmental category – in accordance with the core option of the GRI G4 Guidelines.

First of all, it is important to bear in mind that of the evaluation of approach and attitude towards environmental reporting of these companies bases on the reports of the year 2015. Secondly, one must also know that in 2015 the companies found themselves in some sort of a transition phase, which continues to last until now. This transition phase becomes apparent when looking at the numbers of documents, in which environmental information is to be found. These documents mainly contain the same information, occasionally with some extra information. One reason is that companies try to change the reporting guidelines or standards according to which they prepare their reports. Another reason is that they want to merge Sustainability Reports, Annual Reports and Annual Integrated Reports (Urban-Hübler 2017).

VERBUND for example prepares an Integrated Annual Report as well as its DMA document and the Extra Document (EDO). The environmental information of the EDO is mainly congruent with the environmental information in the Integrated Annual Report. However, it is still necessary to consult the EDO for an analysis of the report. This is the case because the GRI Content Index in the Integrated Annual Report of 2015 only indicates the section or the document, in which the respective information is to be found but does not include the page number. However, the GRI Index in the EDO does include the page number. Upon request, one of the responsible persons for Sustainability at VERBUND, reasoned the number of documents firstly with the already mentioned transition phase and secondly with a limit on the maximum page-numbers of the Integrated Annual Report (Urban-Hübler 2017).

OMV still sticks to the approach to prepare a Sustainability Report and an Annual Report. In addition, OMV publishes an extra document with the GRI Index. However, there are barely overlaps of the Sustainability Report and the Annual Report. All relevant disclosures concerning the environment are covered in the Sustainability Report. For the analysis of Wienerberger's environmental performance, information from the Annual Report, the Sustainability Report of 2014 and the Sustainability Update of 2015 is needed, which complement each other. However, Palfinger discloses all its environmental information in its Integrated Annual Report.

All the identified material aspects related to the environment are laid down in table 3 of the materiality analysis. Nonetheless, the first 10 also include other material topics. Table 6 illustrates the numbers of identified material topics related to the environment. Table 7 sums up the numbers of reported environmental aspects and indicators discussed in section 4.2.2. The comparison of these two tables implies a rather contradictory but relatively consistent trend. The more material environmental topics a company identifies the less aspects and indicators encompassed in the GRI Index it discloses. However, this trend is restricted to the four companies, which are analyzed in this case study.

While the materiality analysis of VERBUND only mentions two environmentally relevant topics, it has such a wide reporting scope that it is close to be in accordance to

the comprehensive option of the G4 – at least when it comes to the environmental category. Be that as it may, common sense suggests that the less environmentally relevant material aspects a company identifies, the easier it is to comprehensively disclose their indicators. In regards to VERBUND, it seems that it describes rather broad material aspects. In addition, it also seems that VERBUND reports on environmental aspects that are not material to them. Again, it must be pointed out that environmental reporting from the standpoint of an electricity provider from renewable resources is rather easy compared to an energy provider from sources such as oil and gas. Despite that, OMV still has quite broad scope in comparison. Palfinger and Wienerberger define a high number of material topics. Among them, also the environmentally related topics are considerably more than those of OMV and especially of VERBUND. Nonetheless, the scope of their environmental reporting is substantially smaller.

In this regard, rough cross-sectorial tendencies in the approach to environmental reporting can be deduced. The revision of the materiality analysis in comparison with the scope of the environmental reporting suggests that companies in the sector of energy production consider environmental reporting as more important than companies in the construction sector. While VERBUND and OMV report on significantly more than half of the environmental aspects and indicators of the GRI Index, Palfinger and OMV disclose information on half or slightly above half of the environmental aspects and clearly less than half of the of the indicators. However, there are also differences observable within the energy production sector between VERBUND and OMV, which are described above.

Table 6: Summarized numbers of identified material topics related to the environment (OMV 2016c; Palfinger 2016c; VERBUND 2016a, 2016b; Wienerberger 2016b)

VERBUND	OMV	Palfinger	Wienerberger
2	7	11	16

Table 7: Summarized numbers of reported environmental aspects and indicators (OMV 2016b, Palfinger 2016, VERBUND 2016b, Wienerberger 2016b)

	VERBUND	OMV	Palfinger	Wienerberger
Aspects (12)	11	8	6	7
Indicators (34)	30	22	15	11

4.3. Conclusion of the Case Study

The case study revealed valuable information on how environmental reporting is conducted and on different forms of application of the G4 core option. All in all, it can be said that the materiality analyses of different companies are principally comparable. However, this comparability is limited. On the one hand, different companies might use different ranking schemes, which could constitute a problem for comparability. On the other hand, an isolated observation of the materiality analysis could be misleading as the depth and profoundness of the material topics can vary from company to company. Thus, scope of reporting should be considered related to the materiality analysis in order to attain a comprehensive understanding of the materiality analysis. Thus, this difficulty can be overcome easily with little extra effort.

Similarly to the materiality analysis, also the scope of reporting is comparable. However, in order to be comparable the investigation of the scope must base on the aspects and indicators of the GRI Index.

In contrast to these two, the comparison of the report content is more problematic. Already in an early stage of the attempted comparison, difficulties arose. Firstly, it was a struggle to find environmental aspects for which a comparison would be meaningful. Despite having doubts, I have decided to go into depth of the aspects energy and emissions, which proved to be not expedient. While there were some minor obstacles such as the use of different units, there were also barriers of higher severity. The interpretation of the indicators is significant for its informative value. In other words this means that the same indicator according to the GRI makes a statement about different activities if interpreted differently. Thus, individual scales of the reported indicators make a comparison impossible. However, it seems that there is potential to make steps towards harmonizing the report contents of different companies. It would most likely have no adverse effect for a company to adhere to given units. The GRI could require the disclosure of certain information in weight, in volume, in percentages or in absolute numbers instead of giving them freedom of choice (the G4 leaves the companies a choice of a few units). Nonetheless, the efforts for such harmonization should not be the focal point of future improvements due to their limited meaningfulness.

In addition, the comparative analysis showed that environmental reporting seems to be more important to companies in the energy sector than to companies in the construction sector. However, Palfinger and Wienerberger are also concerned about the environment and include planned steps towards higher environmental protection as well as resource and energy efficiency in their reports. Nonetheless, the GRI Index does not provide any information on additional reported indicators that are not covered by the GRI Index. This could lead to a misinterpretation of environmental reporting of companies. Moreover, the comparative analysis leads to the conclusion that the more environmentally friendly the core business of a company is, the more it sticks to the specifications of the GRI Index. This aspect underlines the motivation of companies to communicate Corporate Social Responsibility (CSR) and the marketing function of environmental reporting. However, this appears to be a logic consequence considering the fact that it is always easier to disclose positive information than to provide transparent information on negative impacts.

The current transition phase between Guidelines and Standards results in the preparation of several documents. These documents partly complement each other and partly consist of the same information. Thus, it requires increased efforts to receive a holistic view on environmental reporting of the companies. Furthermore, it adds to the already existing confusion caused by the large size of the reports. Nonetheless, these documents will most likely merge into one document in the course of time.

5. Summary and Final Conclusions

In a nutshell and historically speaking, the starting point of corporate reporting was financial reporting. Due to increasing awareness of environmental issues and the rising expectation towards companies to take into account social factors, also environmental reporting and social reporting developed. With the introduction of the term sustainable development, the connection between sustainability and a sphere other than the environment, namely the economy and the society, was made for the first time. Thereby, Sustainability Reporting evolved and was mainly expressed with a Sustainability Report. Nowadays, environmental reporting finds itself in a transition phase from Sustainability Reports towards Integrated Reports, which additionally provide a broader context of the disclosed information.

What are the current trends of the GRI and environmental reporting in general? What are the presumable future developments of environmental reporting and what are their consequences on the GRI? The GRI is the most prominent framework for Sustainability Reporting and has an important role in providing a framework for Integrated Reporting. Furthermore, it emphasizes the compatibility of the GRI Guidelines and Standards with Integrated Reporting (GRI 2017e). However, the GRI needs to underline the complementarity of the GRI and Integrated Reporting in order to not make the GRI void. Complementarity in that sense means that Integrated Reporting without Sustainability Reporting is not only encouraged, but also necessary in order to be meaningful. Despite that, the issue of increasing complexity of reporting requirements must be addressed in the future. Integrated Reporting provides a broad sustainability context. Nonetheless, this must not put more pressure on companies that do not have the resources to invest more in the drafting of their reports.

Environmental reporting is in a movement towards more legal regulation and mandatory reporting. There are no references that this movement will change its discourse in the near future. Governments and International Organizations face pressures for ensuring environmental protection and for imposing stricter regulations. Stricter regulations for environmental protection result in a more mandatory framework of environmental reporting. The main stakeholders demanding such legal framework are NGOs, scientists and civil society (Bartels et al. 2017; Willis 2005). However, these stakeholders neglect the consequences of forced regulations of environmental reporting on the competitiveness on the free market. Thus, they also neglect the expediency of them. Moreover, opinions on the actual consequences of more regulation for environmental reporting vary. Some opinions support the idea that it results in a competitive disadvantage of companies that are exposed to such legal pressures compared to companies that are not. Others claim that there will not be any competitive disadvantages, but rather advantages due to the stimulation of innovation in green technologies (Willis 2005).

Beside the number of mandatory frameworks, also the number of voluntary frameworks increases. It seems that the focus of all these frameworks lies in materiality. However, the definition of materiality is not the same (Mosher, Smith, and Wicker 2014). Despite having doubts that in the future only one reporting framework will prevail internationally, the definition of materiality will most likely be harmonized in the long

run.

Transparency of corporate action will dominate over demands of content-comparability and standardization (Mosher, Smith, and Wicker 2014). This development is very well illustrated by the conclusions of the comparative analysis. The case study provides evidence that the materiality analysis, the scope of environmental reporting and the approach of environmental reporting of the different companies are highly comparable. Since the materiality analysis is the basis for the whole report, it provides together with the DMA transparency. This transparency is related to the creation process of the environmental indicators. Thus, the reader of the report knows exactly what a specific indicator means and how it has been calculated.

How is the comparability of the reports? Why has the GRI failed to adequately respond to the criticism of providing too much flexibility in reporting and thus results in too little standardization? While environmental reporting frameworks, in this case mainly the GRI G4 Guidelines provide a profound basis for transparency, demands for content-comparability and standardization cannot be satisfied. The attempted comparative analysis of the report contents demonstrates several obstacles to the reachability of content-comparability and full standardization. It shows that focusing too much on comparability and complete standardization between sectors and even within sectors is not expedient and would compromise the quality of the report. The case study concludes that different sectors need the flexibility granted by the principle of materiality in order to minimize the effort and the complexity for drafting a conclusive report, which constitutes the basis for strategy decisions. The materiality principle is necessary in order to take the specific fields of action of companies into account and to satisfy their individual needs. Thus, fully comparable information would firstly unnecessarily increase efforts and complexity. Secondly, some parts of this information would simply be useless.

What are the influence and the approach of different sectors to environmental reporting? The case study leads to another conclusion concerning differing core businesses of companies. The 4-step comparative analysis showed a trend regarding the significance of environmental protection and thus environmental reporting between the analyzed sectors. It seems that the companies in the energy sector, VERBUND and

OMV, give more attention to comprehensive environmental reporting than those in the construction sector, Palfinger and Wienerberger. Furthermore, the comparative analysis confirmed the rather obvious assumption that within the energy sector, companies, in this case VERBUND, building on renewable energy sources conduct more extensive environmental reporting. However, it has a more beneficial starting point in doing so.

All in all, the conclusions derived from the first part of the thesis mainly match those from the case study. The comparative analysis confirms the necessity of the materiality principle. Furthermore, both parts of the thesis conclude that stringed uniform requirements for environmental reporting, which result in a high standardization standards are not expedient.

5.1. Constraints and further Considerations

The content of this thesis is subject to constraints and considerations. Regarding the first part of the thesis it must be pointed out that the history of environmental reporting and the evolving awareness of environmental issues mainly concern developed countries. The focus lies on western regions, primarily the EU and the US. However, only Austrian legislation and consequently EU legislation are mentioned in this thesis. Furthermore, I want to underline that the term "environmental report" does not refer to a single or specific report but rather to the entire environment-related information disclosed by companies. In the case study environmental reporting refers to the environment-related information disclosed in the Integrated Annual Reports, the Annual Reports, the Sustainability Reports and the additionally published reports. Moreover, despite the fact that the critics in section 3.4 discusses the shortcomings and deficiencies of the entire umbrella of the GRI, it mainly refers to the G4.

Especially considerations regarding the conclusions drawn from the case study must be taken into account. These considerations mainly relate to the methodology used for the comparative analysis. First of all, the case study explicitly bases on reports drafted according to the GRI G4 core option. Within the G4 Guidelines, it only focuses on the category environment. The case study is conducted via a comparative analysis of four companies. Two companies from the energy sector and two companies from the construction sector in order to allow cross-sectorial and intra-sectorial comparison. However, one must bear in mind that for one thing, two companies of one sector are not

representative for the whole energy sector and the whole construction sector. Before coming to conclusions, its important to point out that each company has a different core business. Despite being in the same overarching sector and having in partial similarities, the basic business activities differ from one another. This fact is highly influential in the conclusions drawn from the case study. Nonetheless, it was not feasible to analyze more companies that would be more likely to represent a comprehensive and realistic picture of the respective sector within the scope of this thesis. In addition, the companies are Austrian. Thus, the conclusions of the comparative analysis primarily apply to Austria.

In terms of the scope analysis of the companies it is important to underline that this is a rather superficial analysis. The scope of indicators reported by the companies does not make a statement about the quality of the reported indicators and whether they reflect the formula suggested by the G4 Implementation Manual. Furthermore, the scope analysis cannot provide reliable information on materiality of the disclosed aspects. The reason for this is that companies are not hindered to report on indicators or aspects that are considered as not material. They are only obliged to report on one indicator for each material aspects. While some companies chose to report on more indicators than required, others prefer to stick to narrower requirements of the G4. In addition, the scope analysis conducted within this comparative analysis does not take into account reported indicators that are not given in the GRI Index. In other words, it is possible that companies create divergent indicators for a given material aspect. However, these are outside of the analysis boundaries.

5.2. Further Research

A suggestion for further research would be a comparative analysis within companies that operate in the exact same field. Therefore, it would be necessary to analyze environmental reports from e.g. a company producing electricity from the same renewable source. Furthermore, the companies should be exposed to the same legal requirements and have roughly the same size and geographic field of operation. Such comparative analysis would potentially lead to deviating conclusions. Furthermore, the discussion on mandatory or voluntary frameworks for environmental reporting could be deepened and case studies could be applied in order to make more solid statements on

the topic. These case studies should include companies of different sizes, who have varying resources to their disposal.

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