



The role of supreme audit institutions in energy accountability in EU countries

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ABSTRACT

The implementation of all the United Nations Sustainable Development Goals (SDGs) requires sustainable energy production and consumption; hence the issue of energy accountability is vital. There are several studies on the activities of supreme audit institutions (SAIs); however, the research question - what is the role of SAIs in energy accountability is still without an answer. Meanwhile, SAIs, as critical public auditors have to evaluate how do governments deal with energy issues, helping not only spend money sparingly but also in an accountable manner.

Based on review the audit reports of 13 from 27 SAIs from the European Member States, we argue that the SAIs strive to maximise public usefulness through ex-post audits mainly focused domestically. This audit approach is not sufficient to strengthen energy accountability in the whole European Union. The process of energy accountability has a supranational character with numerous variables. We offer the potentially radical conclusion and suggestion, that SAIs are not ready for being evaluator in supranational scale, and that they should change their current audit strategies taking more substantial involvement in energy accountability.

1. Introduction

Although SAIs activities are subject of some research (c.f., Mosher, 1979; Pollitt et al., 2002; González et al., 2008; Blume and Voigt, 2011; González-Díaz et al., 2013; Bringselius, 2014; Jeppesen et al., 2017; Van Acker and Bouckaert, 2018; Cordery and Hay, 2019), there is lack of studies on SAI role in energy accountability. Meanwhile, regardless of how domestic auditing systems configured, in each country, SAI plays a vital role as the primary external and independent evaluator of the realisation of government policies.

For public institutions, accountability means permanent responsibility and transparency of settlements. Therefore, one may assume that a specific reporting system will implement, which is a condition of this accountability to occur. The concept of accountability has made a great “career” in the discourse of social sciences, becoming a kind of buzz word in recent decades. This concept is particularly intensively used with the public sector, including SAIs. It is an ambiguous and axiological term, as evidenced by the discursive analysis carried out by Dubnick, combining different types of definitions, narratives, promises made with the work of various researchers. Accountability may, therefore, constitute a commitment to increase democratisation, justice or effectiveness (Dubnick, 2012).

Accountability issues are presented in many scientific studies (c.f., Ospina et al., 2002; Ackerman, 2004; Smith, 2007; Leithwood and Earl, 2009; Whittle et al., 2015; Melville et al., 2017). However, a systematic review of the literature showed that there is a research gap in the field of energy accountability. Such a gap also exists in a case of SAI role in energy accountability. We understand the term “energy accountability” as an obligation or willingness to accept responsibility or to account for one’s actions in the field of planning, obtaining and sustainably using energy.

EU directives impose specific requirements and tasks on the EU Member States. National SAIs should examine the manner of carrying out these tasks under energy accountability. There is a research gap in the scope in which SAIs participate in energy accountability.

Taking into account fundamental need of development of energy accountability on state and international level we would like to describe the role of SAI’s in this process. The research question is the following what is the role of SAIs in energy accountability?

The central thesis of this article is that the SAIs strive to maximise their public usefulness through ex-post audits mainly focused domestically. However, the process of energy accountability has a supranational character with numerous variables, and SAIs are not ready for being evaluator in supranational scale. We offer the potentially radical

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suggestion that SAI should change their current audit strategies taking stronger involvement in energy accountability. There is the necessity of global foresight of energy accountability. Especially demanding should be taking encouraging the close cooperation of countries in the European Union (EU). Finally, we present conclusions of this research.

The paper proceeds as follows: First, we review previous research on energy accountability and the role of the EU as the leader of accountability of energy. Next, based on the literature review on supreme audit institutions, and we take up the question of what is the SAI role in energy accountability. After that, the research method is discussed, followed by the empirical account of 13 randomly selected SAIs from the EU Member States (Lerner and Tetlock, 1999).

2. Previous research and theoretical foundation

2.1. Energy Accountability Concepts

Analysis of literature (books and journals) available online showed that there is a lack of research on energy accountability. We define energy accountability as an obligation or willingness to accept responsibility or to account for one's actions in the field of planning, obtaining and sustainably using energy. Energy answerability refers to the obligation of the public institutions to provide information about their decisions and to justify them to the society and other stakeholders. It includes but is not limited to revealing lobbyists being behind decisions to abandon (or not) from fossil fuels, introduce mechanisms to control car companies as to the accuracy and reliability of the information on cars' safety to the environment, reliability of advertisements showed on tv on the radio. Energy enforcement suggests that someone responsible for the evaluation of accountability may sanction the offending party or take action to remedy the behaviour improper with adopted standards. Continuing Koehane (2003) and Strange (1996) research we distinguish two types of energy accountability: internal and external. The first type is related to internal processes within organisations. The second type involves the relationship between an organization and its environment (O'Riordan, 1989).

2.2. European Union as the leader of accountability of energy

European Union announced that it is a global leader in fighting climate change (European Commission, 2019a). In the fourth report on the State of the Energy Union, European Union underlined that creating the Energy Union has required close cooperation between the EU institutions, Member States and society. The energy security was achieved among others through interconnecting national markets, further diversifying energy sources, and promoting the concept of sustainability (Balitskiy et al., 2014; Stavitskiy et al., 2018). The EU is going to continue digitisation, consumer empowerment, and the development of flexible electricity markets that can cope with high shares of variable renewables (European Commission, 2019b). The EU efforts towards "ecological excellence" should be treated as a goal, and simultaneously the tool in achieving the desired economic and social model (Foundation Robert Schuman, 2018).

Activities related to energy policy in the European Union run in two directions. On the one hand, the EU focuses on the need to change the way of energy production and to move away from fossil fuels towards renewable sources (Jacobsson et al., 2009; Carvalho, 2012; Oikonomou et al., 2012; Bölük and Mert, 2014). On the other hand, the EU tries to increase the effectiveness of energy use by insulating buildings, introducing more energy-efficient devices (Uihlein and Eder, 2010; Gangolells et al., 2016; Tvaronavičienė et al., 2018).

There is a cognitive energy dissonance. Although the EU demonstrates the concept of decarbonisation, more European taxpayer money is supporting fossil fuels than facilitating a sustainable energy transition (Bankwatch Network, 2015). It seems that political decisions limit the EU accountability in energy issues.

The concept of Europe as a clean energy leader is based on the assumption of increasing renewable energy in overall energy production. It is the right concept, though difficult to implement by all EU member states. Countries from the so-called former Eastern Europe, through no fault of its own, but as a result of the Yalta Agreement, entered the Soviet, the economically backward sphere of influence. These countries, in particular Poland, destroyed by the policy of Soviet leaders, continue economic recovery and do not have sufficient resources to modernise the energy sector. These countries use the fossil raw materials they possess. Basing the energy sector only on Russian gas leads to economic and political addiction; hence the demand for diversification of supplies is appropriate. The production of electricity using nuclear power plants calls into question environmental indifference.

The authors' generalisation presented above has confirmation in a study carried out by others. For example, CE Delft states that the European renewable energy and climate targets are formulated as binding result obligations for EU member states. In the field of energy-saving and energy efficiency, however, binding targets are lacking. Meanwhile, the EU member states have a statutory obligation to take (cost-effective) measures to promote energy-saving and energy efficiency (CE Delft, 2011).

An analysis of the activities of the EU Member States in the field of energy leads to the formulation of several questions. The aim of this research is not to answer all of them, but to identify areas that should be examined by SAIs. For example, what is the impact of lobbyists on changes in energy policy in the EU? Will actions aimed at building the Balticpipe affect the monopolisation of gas supplies and threaten the economic stability of EU Member States - Germany's eastern neighbours? How do initiatives in the field of implementing clean energy affect the competitiveness of the economies of the EU Member States? What is the reality in comparison with the declaration?

Further questions can supplement these formulated above. Does EU member states exemplify a sustainable energy transition underway? Or do they normalise something well short of reasonable action, simply because of legal and discursive space permit it without sufficiently rigorous tests? (Dansou and Langley, 2012). However, there is a question: do gradual energy transitions from traditional to "renewable" leads to sustainable development? Mason states that all know a good deal about how to solve it and yet do little about it, and this disjuncture is a crisis of accountability (Mason, 2008). Energy transformation and the transition from fossil-based energy to renewable energy has to take into account social equality. Government policies should not lead to energy poverty, as it would run counter to the concept of sustainable development. Energy poverty is a fact. For example, in Portugal, 800,000 people with 10 million inhabitants benefit from subsidies for tariffs (Delicado et al., 2014; Camilo et al., 2017; Sareen and Haarstad, 2018). There is a need to formulate the question: who makes decisions about resource use and allocation, and how are they held to account? (Kraft and Wolf, 2018). These two questions are particularly valid because the European Commission documents presented above and on the European Commission website lack information on how to ensure energy accountability.

The potential for global climate change has become a significant problem for the current generation. The principle of sustainability aims to assure better living and environmental conditions for future generations, and, because of this, climate change has become a primary international focus. In this paper, we will analyse two aspects of climate change: changes in the average temperature and changes in the day-to-day variability of temperature. As a result of our study we find that, in Paris, the average temperature has increased by approximately 0.5 °C over roughly the last century, while the variance of the daily temperature has slightly decreased. We then tie these results into a broader overview of the more significant phenomenon of global climate change. All three major sectors of economic activity: agriculture, industry and services are influenced by climate change, but in this paper, we will focus on the relationship between climate change and the insurance

industry. It is especially relevant, as the insurance industry is focus risk management methods used by the manager to face phenomena such as climate change (Savitz and Gavrilitea, 2019).

2.3. Review of SAI's role in the state

We randomly selected 13 of the 27 SAIs from the EU Member States for the study. These SAIs, basically are not the part of the judiciary. In some countries like Greece or Portugal, SAIs are part of the judiciary. In others, even if SAIs (e.g., France, Spain) perform the jurisdictional function, they do not belong to the judiciary. SAIs are not part of the executive branch of the State. Finally, SAIs are not part of the legislative branch of State, although they belong to parliaments (European Court of Auditors, 2019). All analysed SAIs realise tasks in compliance with INTOSAI standards. SAIs review and evaluate the public organisations and other financed from public funds. They provided information on how do governments implement the Parliaments' decisions. The manner, in which the SAIs carry out their audits derives from the SAI Law enacted by their Parliaments. SAIs establish the facts based on audit evidence, determine the cause and effects of irregularities or best practices, and make proposals to eliminate irregularities in and or improve auditees' activities. SAIs try through their audits affect the activities of institutions using public funds by promoting integrity, transparency, and accountability (e.g. Dye and Stapenhurst, 1998; Politt et al., 2002; European Court of Auditors, 2019).

The building sector plays a crucial role in achieving the EU's energy and environmental goals. Simultaneously more energy-efficient buildings improve the quality of peoples' life while bringing additional benefits for sustainability. To boost the energy performance of buildings, the EU has established a legislative framework that includes the Energy Performance of Buildings Directive (2010)/31/EU (EPBD) and the Energy Efficiency Directive 2012/27/EU. Those directives promote policies that will help achieve a highly energy-efficient and decarbonised building stock by 2050. Following the introduction of energy performance rules in national building codes, buildings today consume only half as much as typical buildings from the 1980s. (European Commission, Energy performance of buildings directive).

Both directives were amended, as part of the Clean Energy for all Europeans package, in 2018 and 2019. In particular, the Directive amending the Energy Performance of Buildings Directive (2018/844/EU) introduces new elements. It obliges the EU Member States to modernise the buildings sector in light of technological improvements and increase building renovations, as part of the European Green Deal. It also includes new rules on smart readiness of buildings, which were published alongside the Renovation wave strategy in October 2020 (European Commission, Energy performance of buildings directive).

The EPBD covers a broad range of policies and measures that will help national EU governments implement tasks to boost the energy performance of buildings and improve the existing building stock. They have to establish long-term renovation strategies, aiming at decarbonising the national building stocks by 2050, with indicative milestones for 2030, 2040 and 2050. The strategies should contribute to achieving national energy and climate plans (NECPs) energy efficiency targets. Besides, EU Member States must set cost-optimal minimum energy performance requirements for new buildings, for existing buildings undergoing a major renovation. For the replacement or retrofit of building elements like heating and cooling systems, roofs and walls all new buildings must be nearly zero-energy buildings (NZEB) from 31 December 2020. Since 31 December 2018, all new public buildings already need to be NZEB energy performance certificates must be issued when a building is sold or rented. EU countries must draw up lists of national financial measures to improve the energy efficiency of buildings. In addition to these requirements, under the Energy Efficiency Directive (2012/27/EU), EU countries must make energy efficient renovations to at least 3% of the total floor area of buildings owned and occupied by central governments. National governments are

recommended to only purchase buildings that are highly energy efficient (European Commission, Energy performance of buildings directive). It creates new tasks for supreme audit institutions. They should evaluate whether public institutions follow the new EU regulations and how do they influence on the private sector.

2.4. Review of SAI energy audits

Literature analysis has shown that there is much research regarding energy audit in production processes, increasing the efficiency of energy transmission, auditing of a commercial building and renewable optimisation sources or households' consumption (c.f., Dongellini et al., 2014; Filippini et al., 2014; Kluczek and Olszewski, 2017).

Some of the researchers (c.f. Herrero and Bouzarovski, 2014) noticed the problem of energy poverty in the EU member states, defining this phenomenon as the inability of a household to secure a socially- and materially-necessitated level of energy services in the home. The results of their work indicate that the classic economic development distinction between the core and periphery also holds in the case of energy poverty, as the incidence of this phenomenon is significantly higher in Southern and Eastern European member states.

Analysis of literature has shown that there is a research gap in the role of SAI in the energy audit.

SAIs from all the globe decided to create the Working Group on Environmental Auditing (WGEA), under the International Organization of Supreme Audit Institutions (INTOSAI). The group aims to improve the use of audit mandate and audit instruments in the field of environmental protection policies, by both members of the Working Group and non-member Supreme Audit Institutions (SAIs). Joint auditing by SAIs of cross border environmental issues and policies, and the audit of international environmental accords, has the Working Group's special attention. WGEA collects all information about the activities of SAIs in the field of auditing issues related to energy and environmental protection (the INTOSAI The Working Group on Environmental Auditing, 2020).

3. Research method

The research question is the following: what is the role of SAIs in energy accountability? The research methodology is based on the analysis of primary documents such as SAIs' reports focused on energy audits. We randomly selected 13 (48%) of the 27 SAIs from the EU Member States for the study. There are SAIs from Germany, Sweden, France, Spain, Portugal, Hungary, Denmark, Slovakia, Belgium, Latvia, Bulgaria, Estonia and Lithuania. Authors have assumed that almost half of SAIs analysed is enough to formulate research conclusions. Analysis of SAIs included audit reports and reports of annual activities available online. The SAI's reports were analysed using Nvivo version 12. We assumed that we take into analysis the SAIs reports listed on the INTOSAI WGEA website. WGEA collects all information about the activities of SAIs in the field of auditing issues related to energy and environmental protection. Authors reviewed all SAIs' data available to the public. It was assumed, that SAIs from the EU Member States follow the INTOSAI standards and provide information to the public about all critical aspects of government activities. The problems that arose in the interpretation of the data collected were: limited verification of data presented in audit reports, and lack of methodological triangulation.

4. Results and discussion

4.1. Energy accountability – critical issue in the European Union. Results in brief

The analysis of SAIs audit reports showed the following:

Government programs related to energy transition were a subject of analysis of German SAI. For example, German SAI reviewed the activity

of the Federal Ministry for Economic Affairs and Energy. Since 2013 this Ministry has had lead responsibility for rolling out energy transition. German SAI has audited the Ministry's efforts made to tackle this challenge. SAI findings are set out in several reports. SAI found that the relevant federal government departments and federal states implemented the shift to clean energy in a poorly coordinated, inconsistent and redundant way. The Federal Government and federal states did not agree on common goals. It was impossible to carry out monitoring action to review project results. The Federal Government did not have an adequate overview of the bearing the transition had on the federal budget ([Bundesrechnungshof, 2018](#)). This audit showed that there was a lack of conditions enabling reliable settlement of actions taken by responsible entities. During another audit, German SAI evaluated the steps taken by the Federal Ministry for Economic Affairs and Energy to implement energy transition. SAI formulated conclusion that the Federal Ministry for Economic Affairs and Energy has assumed lead responsibility in this task and ensures overall coordination. However, the Federal Ministry could do more to perform its overall coordinator function. No coordinated exchange was taking place either within the Federal Ministry or with other government departments or the German federal states. The Federal Ministry did not have an overview of the financial impact of the energy transition ([Bundesrechnungshof, 2016](#)). German SAI aptly formulated audit question "How much does energy transition cost the government?" or "How much should energy transition cost the government?". SAI found that these critical questions have not been asked and remain unanswered. SAI formulated the conclusion that so far, the Federal Ministry has failed to establish appropriate financial assistance controlling. The Federal Ministry did not evaluate the results of its funding programmes. SAI formulated the opinion that the Federal Ministry for Economic Affairs and Energy did not efficiently stop improper usage of public funds. The Ministry has not ensured that programmes with little efficiency which at the same time add little value to energy transition are phased out and that the funds thus released can be put to better use. SAI, therefore, perceive the risk that bringing energy transition forward will become an ever more costly exercise ([Bundesrechnungshof, 2016](#)).

SAIs among others from Estonia, Portugal, Austria, Slovenia, Finland and Greece stated, based on their audits, that emission reduction targets or commitments are generally in place but are not always supported by comprehensive and specific national, regional, or sectoral strategies. It makes it challenging to drive action and to monitor progress. Some audits found that strategies and plans did not form the basis for achieving sustained success over the long term. SAIs underlined conflicts between programs. For example, land-use policies that permit urban sprawl can work against efforts to improve energy efficiency. SAIs found lack of risk management approach. SAIs noticed that governments should consider potential climate change impacts when formulating public policies to reduce the need for more costly steps in the future. Emissions trading and the Clean Development Mechanism, which are essential policy tools under the Kyoto Protocol, have not yet driven significant emissions reduction. Many audits have concluded that there are difficulties in designing and implementing emissions trading. Weak management structures impair coordination and alignment among levels of government ([INTOSAI WGEA, 2010](#)). French SAI, in its report, pointed out a sample of poor accountability, although the report was focused on the costs of the nuclear power sector instead of only accountability issues. SAI formulated the opinion that generating electricity from nuclear power is a long-cycle, capital-intensive industry in which the cost of capital is a variable – and one which has a highly significant impact when calculating the overall cost involved. However, it is impossible to reconstruct the funding of these nuclear investments accurately for want of information and lack of a specific funding method. SAI also noticed that precise estimates of dismantling costs could not be obtained for want of genuinely comparable national or international experience. Finally, the estimated cost of long-term radioactive waste management is not determined ([Cour Des Comptes, 2012b](#)).

In another audit report, the French SAI noticed problems with biofuel's policy. SAI showed that after 15 years of policies in favour of biofuels the only equilibrium that has been changed by these policies has been agricultural; no other equilibrium, whether energy independence or the reduction of greenhouse gas emissions, has been altered a great deal, if at all. The French SAI pointed out that the French authorities' desire to be more ambitious than their European partners has resulted in incoherent objectives which are now making it impossible to meet the targets. In other words, SAI drew attention to the lack of a coherent policy and steady development in the field of energy throughout the EU ([Cour Des Comptes, 2012a](#)).

Spanish SAI reviewed the activity of Center for Energy, Environmental and Technological Research (CIEMAT) and found that CIEMAT has not recorded in the own accounts certain operations. For example, the operations related to the EURATOM-CIEMAT have been excluded from CIEMAT accounting ([Tribunal De Cuentas, 1998](#)). This situation limited transparency and accountability.

Eight SAIs (from Hungary, Slovakia, Belgium, Portugal, Latvia, Bulgaria, Estonia and Lithuania) reviewed how did their countries fulfil the public sector's leading role in the field of energy efficiency of buildings, which is the central requirement of the Energy Efficiency Directive (EED). SAIs found that these efforts should have been more considerable and more systematic. SAIs found in their countries that public institutions have mostly done well in transposing the concrete targets of the EU directives into national law. For example, most countries have put in place the 3% renovation or energy-saving target for public sector buildings and devised necessary financial instruments. Nevertheless, the realisation of targets was weak. SAIs found that though both the 3% target and the deadline for nearly zero-energy buildings have been set in national legislation, proper planning and measuring for achieving the targets are lacking in some countries. SAIs found examples of inadequate funding and the poor quality of data on renovations or energy saved. SAIs also stated that the implementation of energy efficiency programmes could be more efficient and effective ([SAO of Latvia, 2018](#)).

The Swedish SAI has audited the total support to solar power based on Sweden's energy and climate policy objectives. The SAI analysed whether the material presented to the Parliament decision was adequate and transparent, in particular as regards socio-economic analyses. The Swedish NAO's formulated conclusion that this material was flawed. It was found that mostly lacked socio-economic analyses and that the cost-effectiveness of the support with the objective of increased renewable electricity has not been sufficiently highlighted ([The Swedish National Audit Office, 2017a](#)). The Swedish SAI has also audited the effectiveness of the Swedish Radiation Safety Authority's supervision of nuclear power reactors in operation.

The Swedish SAI's overall conclusion is that supervision of nuclear power by the Swedish Radiation Safety Authority should carry out its supervision on the scale that the Parliament has given financial scope for and in a more systematic way. The Swedish Radiation Safety Authority's appropriation for supervision and other activities referring to nuclear power plants has increased since 2010, but the audit shows that the Authority has not made full use of the additional funds. The Swedish SAI pointed out that the Authority has not supervised to the extent requested by the Government and Parliament. The audit also shows that the Swedish Radiation Safety Authority does not make systematic risk assessments ([The Swedish National Audit Office, 2017b](#)). Hence it is not clear whether the supervision is adequate.

Danish SAI in its audit report assesses that the Ministry of Energy, Utility and Climate's effort to ensure that the energy efficiency obligation scheme (EEO) promotes cost-effective energy savings has been unsatisfactory ([The Danish SAI, 2016](#)). [Table 1](#) summarizes section 4.1 of this article, showing the key findings related to energy accountability in the European Union Member States.

Table 1

The key audit findings related to energy accountability.

The Source of Information	The Audit Scope	The Main Audit Findings
The German SAI (2018)	The Federal Ministry for Economic Affairs and Energy and its activities in rolling out energy transition.	The relevant federal government departments and federal states implemented the shift to clean energy in a poorly coordinated, inconsistent and redundant way. The Federal Government and federal states did not agree on common goals.
The German SAI (2016)	The Federal Ministry for Economic Affairs and Energy and its activities to implement the energy transition.	The Federal Ministry did not have an overview of the financial impact of the energy transition. It creates the risk that bringing energy transition forward will become an ever more costly exercise.
The INTOSAI WGEA (2010)	The government activities on emission reduction targets or commitments. Estonia, Portugal, Austria, Slovenia, Finland and Greece.	The emission reduction targets or commitments were not always supported by comprehensive and specific national, regional, or sectoral strategies. Besides, it was found lack of risk management approach. Governments should consider potential climate change impacts when formulating public policies to reduce the need for more costly steps in the future.
The French SAI (2012a)	The French government.	After 15 years of policies favouring biofuels, the only equilibrium that these policies have changed has been agricultural; no other equilibrium, whether energy independence or the reduction of greenhouse gas emissions, has been altered a great deal, if at all. The French authorities' desire to be more ambitious than their European partners has resulted in incoherent objectives, making it impossible to meet the targets.
The French SAI (2012b)	The French government.	It was found poor accountability in the nuclear power sector. It was impossible to reconstruct the funding of nuclear investments accurately for want of information and lack a specific funding method. The estimated cost of long-term radioactive waste management was not determined.
The Spanish SAI (1998)	The Center for Energy, Environmental and Technological Research (CIEMAT).	It was found the accounting irregularities in CIEMAT. Revealed examples of not recorded in accounts certain financial operations showed CIEMAT limited transparency and accountability.
The Latvian SAI (2018)	The Governments from Hungary, Slovakia, Belgium, Portugal, Latvia, Bulgaria, Estonia and Lithuania. How did these countries deal with achieving the energy efficiency of buildings, which is the central requirement of the Energy Efficiency Directive (EED)?	It was found that the realisation of targets was weak. Although both the target and the deadline for the program - having nearly zero-energy buildings have been set in national legislation, proper planning and measuring for achieving the targets are lacking in some countries. Besides, it was found examples

Table 1 (continued)

The Source of Information	The Audit Scope	The Main Audit Findings
The Swedish SAI (2017a)	Sweden's energy and climate policy objectives related to support to solar power.	of inadequate funding and poor data quality on renovations or energy saved. It was found that mostly lacked socio-economic analyses and that the cost-effectiveness of the support with the objective of increased renewable electricity has not been sufficiently highlighted in this policy.
The Swedish SAI (2017b)	The Swedish Radiation Safety Authority.	It was found that the Swedish Radiation Safety Authority should carry out its supervision on the scale that the Parliament has given financial scope for and in a more systematic way. Besides, the Swedish Radiation Safety Authority did not make systematic risk assessments.
The Danish SAI (2016)	Ministry of Energy, Utility and Climate.	The Danish energy efficiency scheme needs improvements to achieve its goals better.

4.2. Methodological limitations of SAIs audits

The analysis of SAIs audit reports published in INTOSAI WGEA webpage showed that:

SAIs carried out ex-post audits, which means that they related to activities of audited entities that were completed before SAIs started audits. Although such audits revealed irregularities, they did not prevent them SAIs did not audit and evaluated transnational energy accountability, although they perform joint audits. These audits focused on domestic energy policies. SAIs revealed instances of poor coordination of activities, inefficient strategy setting, incomplete information delivery, and errors in the accounting of entities responsible for energy matters. SAIs did not evaluate whether the decision-makers of energy transformation policy took into account the problem of energy poverty in the EU member states. This problem slows down or even limits the implementation of ambitious EU plans to move away from fossil fuels. SAIs did not answer to the critical question may actions aim at building the Balticpipe affect the monopolisation of gas supplies and can threaten the economic stability of EU Member States from Central and Eastern Europe? They did not answer to the crucial question do EU member states normalise energy transition policy not because they are reasonable action, but only because of discursive space fueled by NGO green-initiatives. They did not determine they did gradual energy transitions from traditional to "renewable" lead to sustainable development? Lack of SAIs analyses in this field leads to a crisis of accountability, which was underlined by Mason (2008). The question formulated by Kraft and Wolf (2018) about decision-makers of energy policy and their accountability is still without an answer.

5. Conclusion and policy implications

Energy accountability is a relatively new concept focused on: reliable, sustainable and transparent settlement and calculation of energy production and consumption. As the energy sector belongs to the strategic activity of the state, the national SAI is responsible for controlling the accountability of the whole sector. EU is also the world leader in the transition towards more sustainable and green energy sources. Role of SAI's in sustainability transition will also be part of the accountability process in the energy sector.

Regular energy consumption audits are necessary to identify cases of waste of energy. It also helps identify best practices for energy

consumption. One may generalise that such audits can help in achieving energy accountability and sustainability. Every reduction in energy consumption helps reduce carbon emissions and makes the environment safer.

This research showed that SAIs revealed instances of poor coordination of activities, inefficient strategy setting, incomplete information delivery, and errors in the accounting of entities responsible for energy matters. However, these audits took the form of ex-post, which means that they related to activities of audited entities that were completed before SAIs started audits. Although such audits revealed irregularities, they did not prevent them. It means that the resources were used and the benefits were not achieved as planned. One can formulate a generalisation that, when auditing energy matters, SAIs lost energy to determine something that had already happened.

Answering the research question, we claim that the SAIs fulfil the role as a public evaluator of realised national programs, but their role as a public advisor of government plans is weak. The SAIs strive to maximise their public usefulness through ex-post audits mainly focused domestically. However, the process of energy accountability has a supranational character with numerous variables, and SAIs are not ready for being evaluator in supranational scale. The most critical questions from the perspective of whole the EU remain without answers. There is a lack of SAIs studies on, do gradual energy transitions from traditional to “renewable” leads to sustainable development and will affect the competitiveness of the economies of all the EU Member States? We offer the potentially radical suggestion that SAI should change their current audit strategies and consider ex-ante audits of energy policy, taking into account that such policy influences on all sectors and business dimensions in the long term.

Authors' contributions

Conceptualization, Z.D. and Ł.S.; methodology, Z.D.; software, Z.D.; validation, Z.D., formal analysis, Z.D.; investigation, Z.D.; resources, Z.D. and Ł.S.; data curation, Z.D. and Ł.S.; writing—original draft preparation, Z.D. and Ł.S.; writing—review and editing, Z.D.; visualization, Z.D.; supervision, Z.D. and Ł.S.; project administration, Z.D..

Declaration of competing interest

Founded by Jagiellonian University, POB FutureSoc. The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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