International Benchmarking

SPOTLIGHT ON ENERGY TRANSITION

Methodologies and Practices for Audits

UNDP

INTOSAI

TCU FEDERAL COURT OF ACCOUNTS

FEDERAL COURT OF ACCOUNTS

International Benchmarking

SPOTLIGHT ON ENERGY TRANSITION

Methodologies and Practices for Audits

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Prepared For

Brazilian Federal Court of Accounts (TCU)
&
United Nations Development Programme (UNDP)

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Summary

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Introduction

The International Technical Cooperation Project BRA/23/022 – "Strengthening and Internationalizing the TCU for the Promotion of Sustainable Human Development" – falls within the framework of the Basic Agreement on Technical Assistance between the Government of the Federative Republic of Brazil and the United Nations (UN), enacted through Decree No. 59,308/1966. The project aims to develop studies, tools, and innovative methodologies, as well as to implement and evaluate pilot actions directed at the Federal Court of Accounts (TCU), focusing on fostering innovation and internationalization. This initiative supports the TCU's role in promoting sustainable human development in alignment with the Sustainable Development Goals (SDGs) and the 2030 Agenda.

As an external control body that assists the National Congress in monitoring the country's budgetary and financial execution, the TCU seeks to become a benchmark for an efficient, ethical, agile, and responsible Public Administration. The TCU will be presiding over INTOSAI until the end of 2025 and will maintain an active role in this significant organization. The partnership with the United Nations Development Programme (UNDP) strengthens knowledge exchange and the dissemination of best practices globally, solidifying the TCU's position as a benchmark in external control. The UNDP's expertise and global presence are crucial tools for achieving the desired outcomes, enhancing the quality, and increasing the international visibility of the TCU's actions.

Among the external control activities carried out by the TCU, audits on various infrastructure topics stand out, particularly those related to energy transition. This theme has been addressed in targeted audits and, more recently, in a systemic manner, focusing on national public policies.

On the international stage, a recent study conducted by INTOSAI's Working Group on Audit of Extractive Industries (WGEI) highlighted the absence of specific methodologies for audits concerning energy transition (INTOSAI, 2024). This underscores the need for a broader international benchmarking effort to serve as a reference for the actions of SAIs in this area.

This international benchmarking will provide inputs for the development of the TCU **Energy Transition Audit Guide** (2024) and will serve as a foundation for guiding future oversight actions at both national and international levels.

Objective

This document presents a selection of 30 audit reports conducted by 16 Supreme Audit Institutions (SAIs), including in the European Union, on topics related to energy transition. Each summary sheet provides key findings, methodologies employed, and observed impacts, offering a comprehensive and comparative view of international audit practices.

The main objective is to highlight relevant aspects that can inspire future audits on energy transition and to share best practices. Organized into four fundamental pillars — governance, fair and inclusive energy transition, finance, and energy transition agenda topics — these summaries aim to disseminate best practices and underline key points that may guide future audits.

The examples provided demonstrate the diversity of approaches adopted by SAIs, offering valuable insights to strengthen oversight efforts and align practices with international standards of excellence.

List of Summarized Audits

Table 1 lists the reports synthesized in the summary sheets presented in the Appendices.

Table 1 - List of Summarized Reports

I.D	Country	Year	Original Report Title	SAI (Author)
1	South Africa	2022	On the Rehabilitation of Derelict and Ownerless Mines	Auditor-General of South Africa
2	South Africa	2010	Performance Audit Report on the Status of Climate Change Initiatives in South Africa	Auditor-General of South Africa
3	Germany	2024	Energiewende Nicht Auf Kurs	Bundesrechnungshof
4	Germany	2019	Prüfung von Maßnahmen zum Netzausbau für die Energiewende	Bundesrechnungshof
5	Germany	2016	Maßnahmen zur Umsetzung der Energiewende durch das Bundesministerium für Wirtschaft und Energie Schwerpunkt	Bundesrechnungshof
6	Australia	2024	Governance Of Climate Change Commitments	ANAO
7	Australia	2020	Investments By the Clean Energy Finance Corporation	ANAO
8	Australia	2020	Grant Program Management by The Australian Renewable Energy Agency	ANAO

I.D	Country	Year	Original Report Title	SAI (Author)
9	Colombia	2023	Evaluación a la Política Pública de Transición Energética 2012 - 2022	CGR- Colombia
10	Costa Rica	2021	Desafíos de la Transición Energética desde la Perspectiva de la Hacienda Pública	CGR-Costa Rica
11	United States	2023	Airport Infrastructure: Selected Airports' Efforts to Enhance Electrical Resilience	GAO
12	United States	2023	Federal Buildings: Capital Access And Market Options are Key Challenges Facing GSA's Sustainability Efforts	GAO
13	United States	2023	Climate Change: State And Local Efforts to Reduce Greenhouse Gas Emissions from Vehicles	GAO
14	United States	2022	Climate Change: Oversight Of Federal Greenhouse Gas Emissions Reduction Efforts	GAO
15	Honduras	2023	Auditoría De Desempeño Sobre el Cambio Climático Practicada a la Secretaría de Estado en el Despacho de Energía (SEN)	Tribunal Superior de Cuentas

I.D	Country	Year	Original Report Title	SAI (Author)
16	India	2019	Assessment Of Environmental Impact Due to Mining Activities and Its Mitigation in Coal India Limited And Its Subsidiaries	Comptroller and Auditor General of India
17	Indonesia	2022	Performance Audit for Energy Transition	BPK
18	Norway	2014	State Court of Accounts Report on Clean Energy Assistance	Riksrevisjonen (OAG)
19	Portugal	2022	Relatório N.º 4/2022-FS/SRATC - Estratégia Para A Implementação Da Mobilidade Elétrica Nos Açores	TCU
20	United Kingdom	2020	Achieving Net Zero	NAO
21	Mauritius	2023	Implementation Of Measures for Sustainable Solid Waste Management	NATIONAL AUDIT OFFICE
22	Mauritius	2017	Moving Towards Renewable Energy - Solar Water Heater Grant Scheme	NATIONAL AUDIT OFFICE
23	Czech Republic	2020	Promoting Energy Savings for Public Buildings	NKU

I.D	Country	Year	Original Report Title	SAI (Author)
24	Czech Republic	2015	State Budget Funds Provided for Support of Energy Savings	NKU
25	Czech Republic	2014	Finances Earmarked for The Support of Energy Production from Renewable	NKU
26	Turkey	2020	Assessment Of the Preparation Process for Implementing the Sustainable Development Goals (SDGs)	Turkish Court of Accounts (TCA)
27	European Union	2024	Gas Supply Security in the EU	TCE
28	European Union	2024	The EU's Industrial Policy on Renewable Hydrogen	TCE
29	European Union	2023	EU Climate and Energy Targets	TCE
30	European Union	2023	The EU's Support for Sustainable Biofuels in Transport	TCE

Analysis of Best Practices

In partnership with the United Nations Development Programme (UNDP), the Brazilian Federal Court of Accounts (TCU) conducted a detailed survey on the performance of Supreme Audit Institutions (SAIs) in the context of energy transition. This international benchmarking, concluded in November 2024, highlighted that many SAIs have adopted innovative methods in their audits, including the use of big data analysis, modeling, and energy projections, as well as integrating experts with in-depth knowledge of topics related to the energy transition.

Among the three main types of audits conducted globally — 1) Financial; 2) Compliance; and 3) Performance — it was observed that most audits on energy transition are performance audits. Over the years, this type of audit has proven to be the most effective in providing in-depth and systematic analyses of the sector, offering significant contributions to advancing the topic.

A significant portion of energy transition audits use the standard methodology of performance audits, applied in various policy areas. This methodology involves techniques for obtaining testimonial evidence, including meetings, inquiries, interviews, and consultations with the audited entities.

Another widely used method is obtaining analytical evidence, which involves document review, analysis of the legal framework, and the use of specific techniques such as stakeholder analysis, SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats), and the Risk Verification Diagram (RVD). A relevant example is the audit conducted by Honduras in the field of climate change. In some cases, the methodology also relies on primary statistical data provided by official institutions, which increases the reliability of the findings. For instance, the European Court of Auditors (ECA) bases part of its audit methodology on data provided by Eurostat, the same data reported by Member States to the European Commission.

The application of sampling techniques is also common in the analyzed audits. Examples include the audit by the Czech Republic on measures to improve the

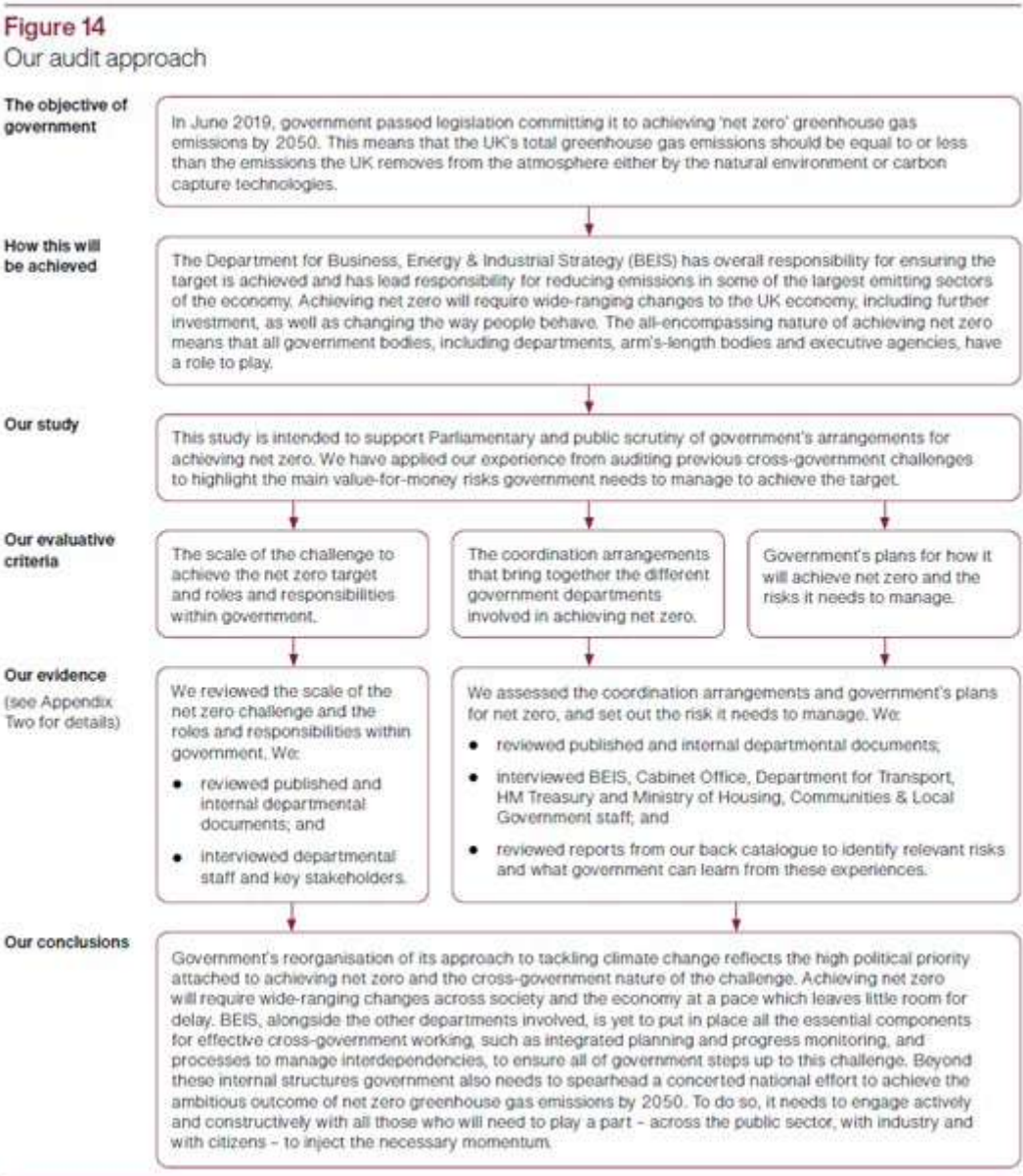
energy performance of residential buildings, as well as audits conducted by India, the Republic of Mauritius, the Azores (Portugal), Costa Rica, Turkey, Australia, and the European Court of Auditors. Some audits also collect physical evidence through on-site visits and inspections. Examples include the United States audit on energy resilience at airports, as well as audits carried out by South Africa, the Republic of Mauritius, Norway, Honduras, and the European Court of Auditors.

The obtaining of documentary evidence is another essential tool for SAIs. This approach includes the review of documents such as plans, strategies, programs, regulations, and checklists related to the audited topic. In countries with a tradition of monitoring energy transition public policies, such as the United Kingdom and Germany, SAIs rely on experiences and reports from past audits to guide their analyses. Based on previous findings and recommendations, they assess the progress of current policies and highlight the main risks the government needs to manage to promote an effective energy transition. Transparency in the audit methodology is valued, with the inclusion of annexes in the reports describing the evaluation criteria and sources of evidence used.

The difference in the robustness of findings, recommendations, methodologies, and criteria presented in this International Benchmarking reflects the quantity and quality of data available in each context. SAIs that have access to comprehensive, up-to-date, and reliable data, often supplemented by expert analyses or consolidated monitoring systems, are able to deepen their investigations and present more detailed and well-founded recommendations. In contrast, contexts with data gaps or access limitations tend to produce more concise reports, due to the need to base analyses on partial or general information. This variation highlights the importance of promoting transparency and systematic data collection to strengthen the impact of audits on the energy transition.

Figure 1 below illustrates a summary of the audit methodology.

Figure 1 - Example of an audit methodology summary.



Source: Achieving net zero. (NAO, 2020)

In addition to using audit criteria based on legislation, regulations, and documents such as strategic and governmental action plans, some Supreme Audit Institutions (SAIs) relied on consultancy reports to assess the performance of public policies related to energy transition. For instance, the audit conducted by the Republic of Mauritius on the Solar Water Heater Subsidy Program utilized consultancy reports commissioned by the appropriate ministry and the MID Fund (the program's implementing body), as well as a public policy guide from the World Energy Council.

None of the evaluated audits presented a specific methodology for addressing energy transition policies. However, through recent practical experiences, countries such as Indonesia, Costa Rica, Germany, and the European Court of Auditors employed Gap Analysis to assess how prepared each country or region is to face the challenges of the transition, identifying discrepancies and suggesting solutions.

The evaluation of public policy pillars, institutional capacities, and the efficient management of public resources are central elements in performance audits on energy transition. Countries like Germany, the United Kingdom, Colombia, Indonesia, and Costa Rica have developed detailed diagnostics of the main challenges their institutions face in achieving a just, inclusive, and economically viable energy transition. Instead of focusing solely on the cost-benefit relationship of projects, these reports highlight strengths and areas needing significant improvement to accelerate the transition.

Some countries faced the challenge of assessing energy transition without compromising the energy trilemma (security, equity, and sustainability). Costa Rica, for example, analyzed the potential effects of the transition on electricity tariffs, as this aspect is crucial for ensuring a fair transition where benefits and costs are equitably distributed.

The importance of aligning program and policy goals with long-term national strategies was emphasized in the audits of countries such as Mauritius and the Czech Republic. The audit in Mauritius highlighted that the targets of the Solar Water Heater Subsidy Program should be linked to the overarching goal of the country's Long-Term Energy Strategy. Similarly, the Czech Republic's audit recommended

that ministries responsible for policies aimed at improving the energy performance of residential buildings evaluate the contribution and feasibility of energy-saving targets, ensuring compliance with the European Union's energy efficiency directive.

Lastly, some SAIs have stood out for their use of energy projections and economic estimates based on official data and robust assumptions. Indonesia, for instance, developed a model to predict the impact of policies on generation costs and government subsidies. Costa Rica estimated that its Decarbonization Plan will require an investment of USD 24 billion in the transportation sector. The Czech Republic's audit used assumptions to estimate that the total costs of renewable energy sources supported by public policies will exceed one trillion Czech korunas by 2030.

Conclusions

Supreme Audit Institutions (SAIs) are positioned as essential agents in the global energy transition, fostering transparency and accountability in public policies. These institutions promote good governance and help ensure that the benefits of the transition are distributed equitably, contributing to addressing global challenges such as inequality, poverty, hunger, and the impacts of climate change. By auditing areas like energy security, renewable energy, finance, and social sustainability, SAIs not only strengthen trust in the investment environment but also drive more effective and coherent public policies.

This international benchmarking study revealed that, while many SAIs adhere to traditional performance audit methodologies, there is a growing effort to innovate by adopting tools such as big data, statistical modeling, and energy projections. These advanced practices, combined with technical expertise, enable SAIs to offer increasingly precise and impactful recommendations, enhancing the success of energy transition policies.

The study also highlights the importance of a specific and robust approach to auditing the energy transition, capable of addressing the complex "Energy Trilemma"—balancing security, equity, and sustainability. Through Gap Analysis, SAIs

have the opportunity to identify weaknesses in public policies and propose solutions tailored to each country's reality. In doing so, they play a transformative role in supporting governments to build a more just, inclusive, and sustainable energy transition aligned with future challenges and opportunities.

References

INTOSAI, 2024. *WGEI 2024 Survey Report on Energy Transition*, s.l.: Working Group on Audit of Extractive Industries (WGEI) / International Organization of Supreme Audit Institutions (INTOSAI).

South Africa – Rehabilitation of derelict an ownerless mines

TITLE	Rehabilitation of Derelict and Ownerless Mines		
Author	*Auditor-General of South Africa (AGSA)*		
Country	South Africa	Publication	2022
Accessed on	https://www.agsa.co.za/Portals/0/Reports/Special%20Reports/2021/Follow-up%20performance%20audit%20at%20the%20Department%20of%20Mineral%20Resources%20and%20Energy.pdf?ver=2022-03-31-100727-587		
Highlighted energy transition topics present in the report	Governance		Yes
	Just and inclusive energy transition		Yes
	Finance		Yes
	Covers more than one energy transition theme (Technologies)		No
	Broad assessment of the energy transition		No

Context

Derelict and ownerless mines pose significant risks to the environment and the health of local communities, particularly those near residential areas.

The Department of Mineral Resources and Energy (DMRE) in South Africa undertakes efforts to seal and rehabilitate these mines, ensuring citizens' constitutional right to a safe and healthy environment. Rehabilitation measures include sealing quarries, pits, and trenches to minimize environmental risks and enhance safety.

Audit Scope

The audit was a follow-up to the 2009 performance audit on derelict mine rehabilitation, aimed at assessing the DMRE's progress since then. It focused on determining whether the situations and findings identified in 2009 persist. Considering the elapsed time since the previous audit, administrative changes, and the merger of the DMRE with the Department of Energy, the focus on recommendations and corrective actions could not always be directly linked. Thus, AGSA relied on the 2009 audit results to ensure consistency in approach and reporting.

The audit aimed to evaluate the DMRE's actions in ensuring the economical use of resources and the efficiency and effectiveness of its management of the rehabilitation of derelict and ownerless mines in South Africa. The experiences of citizens directly impacted by these mines were also considered within the audit's scope, emphasizing the social impact of the issue.

Key issues addressed

The main issues covered in the analyzed document were:

1. Is the rehabilitation process for derelict and ownerless mines timely and cost-effective?

2. Does the Department of Mineral Resources and Energy (DMRE) have strategic guidelines, operational plans, budgets, and deadlines to ensure effective rehabilitation?

3. Does DMRE management have adequate information to monitor and evaluate the rehabilitation process?

4. Is the DMRE efficiently organized, with trained teams to carry out mine rehabilitation?

5. Is there coordination among the various stakeholders involved in the rehabilitation process?

Methodology and criteria used

The performance audit was conducted in accordance with ISSAI 3000 standards and AGSA's 2019 Performance Audit Manual, which sets the methodological standards for planning, executing, reporting, and following up on public sector audits. Given the complexity of the audited environment, the analysis focused on DMRE's strategic areas to verify compliance with mine rehabilitation actions.

To ensure the accuracy of findings and facilitate corrective measures, a steering committee composed of the audit team and DMRE senior management members was established. This committee reviewed the findings throughout the process, allowing the DMRE team to provide input for the final report.

The methods employed in the audit included management team interviews, document analysis, observations, and technical visits to 11 mines, comprising six rehabilitated asbestos mines and five closed mines. The audit also assessed whether the DMRE had established strategic and operational plans aligned with rehabilitation policy, verifying whether measures adopted since 2009 were effectively implemented to mitigate previously identified deficiencies.

Main findings

The audit found that:

1. The slow rehabilitation of derelict and ownerless mines continues to negatively impact the environment and public health.

2. Of over 6,100 abandoned mines, few have been rehabilitated since 2009, with an annual average of 2.25 mines.

3. Alterations to soil, water regimes, and vegetation, along with air pollution and degraded water resources, are common in abandoned mine areas.

4. Communities near the mines are exposed to toxic contaminants, and vast areas of degraded land hinder sustainable economic development.

Recommendations presented

The most relevant recommendations were:

1. The DMRE should consider the strategic importance of the derelict and ownerless mines program within its strategic objectives and current mandate. Priority and funding for managing abandoned mines should be key considerations during this process.

2. The DMRE should prioritize the rehabilitation program in its objectives and ensure adequate funding.

3. Finalize the national strategy for closing and repurposing areas.

4. Validate the database of abandoned mines to develop a comprehensive rehabilitation plan.

5. Strengthen coordination among different stakeholders to ensure the swift and efficient implementation of the rehabilitation program.

Best practices

The performance audit was conducted in line with ISSAI 3000 guidelines and AGSA's 2019 Performance Audit Manual, adopting a robust methodological approach that included document analysis, interviews, and technical visits.

The process involved continuous information exchange with DMRE management, allowing for a detailed review of the audit's findings and recommendations to ensure their relevance and accuracy. This collaboration with the audited entity promoted transparency and alignment, increasing the potential positive impact of the audit.

★ Key highlight

AGSA adopted a rigorous validation strategy by involving the senior management of the Department of Mineral Resources and Energy (DMRE) in the audit process. Detailed discussions allowed the DMRE team to directly contribute to the improvement of the final report, resulting in more precise and feasible recommendations.

This collaborative approach facilitates the prompt implementation of corrective actions for identified weaknesses, serving as a model to inspire other SAIs in their performance audits.

South Africa - Status of climate change initiatives in south africa

TITLE	Status of Climate Change Initiatives in South Africa		
Author	*Auditor-General of South Africa* (AGSA)		
Country	South Africa	Publication	2010
Accessed on	https://www.agsa.co.za/Portals/0/Repository/95207_NEW_Inners%20small.0cfd6287-3734-4c9c-932b-758244ab5835.pdf		
Highlighted energy transition topics present in the report	Governance	Yes	
	Just and inclusive energy transition	Yes	
	Finance	Yes	
	Covers more than one energy transition theme (Technologies)	Yes	
	Broad assessment of the energy transition	Yes	

Context

Climate change can have significant impacts on various sectors of South African society and economy. South Africa has a fossil fuel-intensive economy, primarily due to its reliance on coal-based energy sources. Therefore, energy transition is a crucial pathway to mitigate the impacts of climate change in the country.

South Africa ratified the United Nations Framework Convention on Climate Change (UNFCCC) and adhered to the Kyoto Protocol. However, as a developing country, it had no legal obligation to meet quantified emission reduction targets. According to 2000 greenhouse gas data, South Africa was among the world's top 20 emitters of greenhouse gases at the time of the report's publication.

Audit Scope

The focus areas were categorized into the following key themes and sub-themes:

1. Mitigation: strategies, implementation, coordination, policy instruments, Clean Development Mechanism (CDM) projects, finance.

2. Adaptation: strategies, implementation, coordination, instruments, monitoring, finance.

Key issues addressed

The main issues addressed by AGSA in the analyzed document were:

1. What commitments related to the mitigation of greenhouse gas emissions have been adopted by the government?
2. What policy instruments are being adopted or utilized by the government?
3. Do plans or strategies establish reduction targets?
4. Are policy choices and targets based on environmental, social, and economic data?
5. Is the government monitoring expenditures and revenues?
6. Are the roles and responsibilities assigned to government bodies documented?
7. Are data on actual and expected (forecasted) emissions at the facility level available?
8. What strategies and plans have been developed for purchasing CDM credits?
9. Have donor countries successfully provided funding to support programs and projects aimed at reducing greenhouse gas emissions?

Methodology and criteria used

The work was conducted in accordance with the International Standard on Related Services (ISRS 4400), applied to agreed-upon procedure audits. While recommendations are not typically part of reports under this standard, this work identified areas where some recommendations were deemed pertinent and useful to enhance government actions.

The agreed-upon procedures were developed in collaboration with the INTOSAI Working Group on Environmental Auditing.

Additionally, the procedures were agreed upon with the Department of Environmental Affairs (DEA).

Several strategic documents and action plans on climate change were analyzed, including:

- Long-Term Mitigation Scenarios (2007).
- National Climate Change Response Policy Framework (2009).
- Declaration from the National Climate Change Summit (2009).

Finally, a steering committee was established between AGSA and the DEA, ensuring fact validation and the incorporation of management feedback during various meetings held throughout the review process. This collaborative process contributed to the accuracy and robustness of the conclusions presented.

Main findings

1. Need for rigorous monitoring and performance evaluation of climate change actions by all relevant stakeholders.

2. Ineffectiveness of the government's oversight functions over the bodies responsible for climate actions.

3. Delays in the response time for registering CDM projects, impacting implementation.

4. Challenges in securing donor funding for climate projects, exacerbated by international competition.

5. Lack of centralization in the control and management of donor funding allocated to climate change.

6. The absence of an official plan was identified as a significant challenge for energy sector governance in South Africa and, consequently, for setting greenhouse gas reduction targets.

Recommendations presented

1. Need for rigorous monitoring and performance evaluation of climate change actions by all relevant stakeholders.

2. Ineffectiveness of the government's oversight functions over the bodies responsible for climate actions.

3. Delays in the response time for registering CDM projects, impacting implementation.

4. Challenges in securing donor funding for climate projects, exacerbated by international competition.

5. Lack of centralization in the control and management of donor funding allocated to climate change.

Best practices

AGSA demonstrated an efficient approach by establishing a steering committee in collaboration with the Department of Environmental Affairs (DEA), ensuring the audit process was conducted collaboratively and transparently. The committee, led by a senior authority in air quality and climate change mitigation, facilitated data validation and consensus on the accuracy of the findings. This institutional collaboration, coupled with strong oversight by the audit body, ensured a robust audit process and seamless integration of recommendations with those responsible for implementing environmental policies.

Cape Town - South Africa
Font: Adobe Stock

★ Key highlight

An innovative aspect of the work was the development and use of structured matrices that clearly defined the objectives and questions to be investigated, created by the INTOSAI Working Group on Environmental Auditing (WGEA). These matrices were agreed upon with the DEA, ensuring alignment between the audit procedures and local needs. The use of these standardized tools promoted the comparability of information, enabling the coordinated audit results to encompass both developed and developing countries. This model can serve as a reference for other SAIs when conducting coordinated audits, providing an effective method to ensure consistency and data exchange across different national contexts.

Germany - The energy transition off track

Title	**The Energy Transition Off Track** *(Energiewende nicht auf Kurs)*		
Author	*Bundesrechnungshof (BRH)*		
Country	Germany	Publication	2024
Accessed on	https://www.*Bundesrechnungshof*.de/SharedDocs/Downloads/DE/Berichte/2024/energiewende-volltext.pdf?__blob=publicationFile&v=4		
Highlighted energy transition topics present in the report	Governance		Yes
	Just and inclusive transition		Yes
	Finance		Yes
	Covers more than one Thematic Area (Technologies) Yes		Sim
	Broad assessment of the energy transition		Yes

Context

Germany's energy transition aims to transform the country's energy mix by prioritizing renewable sources and energy efficiency. This transition is critical for achieving national and European climate protection targets. The Federal Ministry for Economic Affairs and Climate Action (BMWK) leads the implementation of this agenda, while the Ministry for the Environment, Nature Conservation, Nuclear Safety, and Consumer Protection (BMUV) ensures its environmental compatibility.

Audit Scope

The *Bundesrechnungshof* (BRH) leveraged new energy policy directives implemented in response to the global energy crisis to evaluate the German government's progress toward its energy policy goals. The audit focused on three fundamental pillars: energy security, equitable energy access, and the sustainability of the electricity system.

Key issues addressed

The main questions addressed by the BRH in the analyzed document were:

1. What does the energy transition in the electricity sector entail?
2. What actions are required from the government?
3. What are the main objectives of the energy transition?

Methodology and criteria used

The audit was conducted based on the analysis of legislative and strategic documents, including the Energy Industry Act (EnWG) and the Federal Climate Protection Act (KSG), as well as data on the progress of Germany's energy transition.

The main steps included:

Document analysis: Examination of legislative amendments introduced by the "Easter Package" (2022), focusing on the Renewable Energy Sources Act (EEG 2023) and its long-term goals.

Assessment of goals and commitments: Review of greenhouse gas neutrality targets, including the aim to source 80% of gross electricity consumption from renewables by 2030 and the projected increase in gross electricity consumption to 750 TWh.

Examination of constitutional guidelines: Analysis of the Federal Constitutional Court's "Climate Decision" (2021) and the balance between the public interest in renewable energy expansion and other fundamental rights.

Additionally, the planned generation targets for wind and photovoltaic energy (360 GW by 2030) were compared with the installed capacity by the end of 2023 (151.1 GW), highlighting the challenges of implementation.

This analysis and evaluation process identified key structural measures to accelerate the energy transition, reduce dependence on fossil fuels, and address potential conflicts between energy security, equitable access, and sustainability.

Main findings

1. The energy transition faces challenges in integrated planning, affecting both the expansion of renewable energy generation and the development of electricity transmission networks.
2. It was found that the targets for the expansion of renewable energies and transmission networks have not yet been achieved, compromising the progress of energy policies.
3. The lack of an efficient early warning system to identify and mitigate risks to the security of electricity supply was identified, resulting in delayed responses and compromising system stability.
4. The absence of a clear definition of "affordable electricity supply" complicates the implementation of policies that reconcile affordability and sustainability.
5. The high cost of managing congestion in the electrical networks, estimated at 6.5 billion euros annually, highlights the need for greater operational efficiency.
6. The need for investments exceeding 460 billion euros by 2045 for the expansion of electrical networks was identified, creating significant financial pressures on the public budget and the energy sector.
7. Selective state subsidies lack transparency and undermine the price-driving impact, negatively affecting the predictability of the energy system.
8. The lack of a robust system for setting targets and monitoring progress prevents effective evaluation of progress toward a sustainable energy transition.

Recommendations presented

1. Ensure the legal expansion of renewable energy, ensuring that electricity production is safe and controllable at all times.
2. Create structural conditions that encourage investments in generation capacities and the electricity networks needed through robust planning.
3. Harmonize the monitoring of supply security with legal requirements, considering various scenarios and their probabilities of occurrence.
4. Develop a system to assess the economic accessibility of electricity, using clear indicators and threshold values.
5. Ensure sufficient generation capacity is available at all times, preventing significant increases in electricity prices due to supply shortages.
6. Present the costs of the energy transition transparently and in a balanced way, with the federal government explicitly declaring the systemic costs involved.
7. Consistently align the components of the electricity price with energy policy goals, eliminating regulations and small-scale support measures that do not meet these objectives.
8. Define measurable targets for protected assets, such as human health, biodiversity, and cultural heritage, considering their interactions.
9. Design environmental monitoring to record and evaluate changes over time and interactions between different protected assets.
10. Promote training to fill knowledge gaps, developing environmental monitoring in a systematic and comprehensive way.

Best practices

The Federal Court of Auditors (*Bundesrechnungshof*) has established a comprehensive approach to assess whether the federal government is implementing the energy transition in line with energy policy goals. The oversight not only examines the security, accessibility, and environmental compatibility of electricity supply but also adopts an integrated method that considers collaboration between different ministries, such as the Federal Ministry for Economic Affairs and Climate Protection (BMWK) and the Federal Ministry for the Environment and Consumer Protection (BMUV). This practice of interministerial coordination serves as a valuable model for other Supreme Audit Institutions (SAIs), demonstrating the importance of a collaborative and holistic approach in overseeing public policies, especially in complex areas such as the energy transition.

Wind turbines - Germany
Font: Adobe Stock

★ Key highlight

The main highlight of the report is the identification of gaps in the energy transition monitoring system, which compromises the German government's ability to adequately assess the impacts of the policies implemented. The lack of continuous and integrated monitoring can lead to conflicts between the objectives of energy policy, resulting in risks to the achievement of the set goals and the long-term sustainability of the transition. The recommendation emphasizes the urgency of creating a robust monitoring system to ensure the effectiveness and coherence of energy transition goals.

Germany - Transmission Network Expansion Measures for the Energy Transition

TITLE	**Transmission Network Expansion Measures for the Energy Transition** *(Maßnahmen zum Netzausbau für die Energiewende)*		
Author	*Bundesrechnungshof (BRH)*		
Country	Germany	Publication	2019
Accessed on	https://www.*Bundesrechnungshof*.de/SharedDocs/Downloads/DE/Berichte/2019/energiewende-volltext.html		
Highlighted energy transition topics present in the report	Governance	Yes	
	Just and inclusive energy transition	No	
	Finance	Yes	
	Covers more than one energy transition theme (Technologies)	Yes	
	Broad assessment of the energy transition	Yes	

Context

With the commitment to the energy transition, the German government seeks a significant transformation in the supply and use of energy, aiming to reduce greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels. To achieve this goal, Germany has expanded energy generation from wind sources, primarily in the north of the country, requiring the transportation of electricity to high-consumption areas in the south and west.

This need implies the expansion of the transmission network to eliminate bottlenecks in supply and enable cross-border electricity trade. The Federal Network Agency (BNetzA) was tasked with developing the network development plan, and the costs of this expansion are passed on to the end consumer through tariffs.

Audit Scope

The *Bundesrechnungshof* Bundesrechnungshof analyzed the transmission network expansion measures, focusing on the adaptation of the transmission network.

Key issues addressed

The main issues addressed in the audit were:

1. What is the current status of transmission network expansion in Germany?
2. What is the impact of renewable energy generation on the electrical grid?
3. What adjustments are necessary to synchronize generation and the transmission network?
4. What incentives exist to reduce costs and accelerate transmission network expansion?

Methodology and criteria used

The audit used a combination of legal review, analysis of strategic and government documents, and data evaluation to ensure robust conclusions. The audit criteria included relevant standards and laws, such as:

- Energy Line Expansion Act (EnLAG)
- Network Expansion Acceleration Act (NABEG)
- Federal Requirements Plan Act (BBPlG)
- Reports and development plans from BNetzA and the Federal Ministry for Economic Affairs and Energy (BMWi), as well as monitoring reports on network expansion.

The BMWi extensively reviewed and commented on the draft report, and its remarks were incorporated by the SAI into the final version.

Main findings

The audit found that:

1. The transmission grid in Germany is not yet sufficiently developed to support the energy transition.

2. There is a synchronization deficit between the expansion of generation and the transmission network.

3. Transmission network expansion is a bottleneck, generating security measures for the electrical system.

4. The transmission network has not kept pace with the rapid changes in generation and demand.

5. The current compensation system offers few incentives to accelerate the expansion of the transmission network.

Recommendations presented

The *Bundesrechnungshof* recommended that the BMWi:

1. Consider the transmission network expansion requirements in the planning of electricity generation and consumption.

2. Integrate the changes resulting from the phase-out of coal into the transmission network expansion planning.

3. Coordinate the expansion of the transmission network and renewable energies with an incentive legal framework that involves all stakeholders.

4. Establish effective mechanisms to accelerate transmission network expansion with operators, exploring, if necessary, changes in ownership and governance structures.

Best practices

The *Bundesrechnungshof* sent the draft report for contributions from the BMWi. This interaction and validation allowed the Ministry to provide detailed comments on the draft, and their feedback was integrated and discussed in the final report. The dialogue ensured the relevance, accuracy, and appropriateness of the proposed recommendations.

★ Key highlight

A key aspect highlighted in the audit was the use of long-term scenarios for the transformation of the energy system in Germany, as outlined in the report “Long-term Scenarios for the Transformation of the Energy System in Germany”. The application of these scenarios allowed the SAI to estimate financial and operational impacts, such as the investment required for network expansion.

Germany - Measures to implement the Energy Transition by the Federal Ministry for Economic Affairs and Energy

TITLE	**Measures to Implement the Energy Transition by the Federal Ministry for Economic Affairs and Energy** *(Maßnahmen zur Umsetzung der Energiewende durch das Bundesministerium für Wirtschaft und Energie)*		
Author	*Bundesrechnungshof (BRH)*		
Country	Germany	Publication	2016
Accessed on	https://www.*Bundesrechnungshof*.de/SharedDocs/Downloads/DE/Berichte/2016/umsetzung-der-energiewende-volltext.pdf?__blob=publicationFile&v=1		
Highlighted energy transition topics present in the report	Governance	Yes	
	Just and inclusive energy transition	No	
	Finance	Yes	
	Covers more than one energy transition theme (Technologies)	Yes	
	Broad assessment of the energy transition	Yes	

Context

The energy transition in Germany refers to the shift from the use of fossil and nuclear energy sources to renewable sources and energy efficiency. The energy transition aims to contribute to achieving climate protection goals, namely reducing greenhouse gas emissions.

The Federal Ministry for Economic Affairs and Energy (BMWi) coordinates the implementation of the energy transition, aiming to meet greenhouse gas reduction targets and the energy policy trilemma: security, equity, and sustainability. According to the BMWi, the energy transition is a major national challenge requiring a unified energy policy to improve coordination within the federal government and avoid frictional losses, while covering the entire energy market.

In addition to the BMWi, other ministries are involved in implementing the energy transition, including the Federal Ministry of Education and Research (BMBF), the Federal Ministry of Transport and Digital Infrastructure (BMVI), the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), the Federal Ministry of Food and Agriculture (BMEL), and the Federal Ministry of Finance (BMF), which is typically responsible for the federal budget.

Audit Scope

The audit focused on:

1. Monitoring the findings of previous audits since the responsibility for the energy transition was assigned to the BMWi in 2013.

2. Analyzing the implementation and direction of subsidy financing programs under the BMWi.

Key issues addressed

The main issues addressed during the audit were:

1. What measures have been taken by the BMWi to implement the energy transition?

2. How much does the energy transition cost the government?

3. How much should the energy transition cost the government?

Methodology and criteria used

The Bundesrechnungshof (BRH) conducted an independent analysis, gathering evidence through document reviews and interviews. In recent years, audits of the energy transition's implementation have covered organizational, human, and financial resources across various departments. In 2014, the BRH prepared a report for the federal government identifying implementation deficiencies and presenting recommendations.

The current audit updates the findings from the initial report and provides a comprehensive view of implementation practices and the management of financing programs, particularly those led by the BMWi. The BRH also examined several financing programs, focusing on those under the BMWi's leadership. The documents reviewed included the Federal Government Report on Financial Aid and Tax Incentives (2013-2016), the Electricity Tax Act, the Energy Tax Act, the fourth monitoring report "The Energy of the Future" (BMWi, 2015), and a letter from the State Secretary to the Budget Committee rapporteur in the Bundestag.

Main findings

1. Lack of an overall view of the financial impact of the energy transition.
2. Inadequate organizational structure for implementation.
3. Insufficient coordination between departments.
4. Poorly defined energy transition goals.
5. Inefficient use of subsidies.
6. Disorganized financial assistance management.

Recommendations presented

1. Centralize information to obtain a comprehensive view of the financial impacts of the energy transition, updating annual reports.
2. Conduct a task review and assess human resource needs.
3. Gain a complete overview of interdepartmental activities to develop a unified approach.
4. Enhance energy transition monitoring by defining measurable goals and setting cost limits.
5. Gradually phase out inefficient programs that disrupt supply and demand balance.
6. Use monitoring results as a foundation for future funding strategies.

Best practices

The report provides a comprehensive update of audit findings since 2013, emphasizing the importance of active ministerial participation in evaluating results. This collaboration is essential to promoting an integrated approach, enabling diverse perspectives to be considered and strengthening control practices.

★ Key highlight

The Bundesrechnungshof highlights the risk of increasing energy transition costs, identifying program inefficiencies as a significant concern. The government and the Federal Ministry for Economic Affairs and Energy (BMWi) are still seeking a balance between climate protection goals and the efficiency of financing programs. Although the audit detailed program expenditures and economic efficiency, it was not possible to determine the total financial impact of the energy transition in Germany.

Australia - Governance of climate change commitments

TITLE	Governance of Climate Change Commitments		
Author	*Australian National Audit Office (ANAO)*		
Country	Australia	Publication	2024
Accessed on	https://www.anao.gov.au/work/performance-audit/governance-climate-change-commitments		
Highlighted energy transition topics present in the report	Governance	Yes	
	Just and inclusive energy transition	No	
	Finance	No	
	Covers more than one energy transition theme (Technologies)	No	
	Broad assessment of the energy transition	No	

Context

Global climate action is structured around two main approaches: mitigation and adaptation. Mitigation involves implementing strategies to reduce greenhouse gas emissions, while adaptation focuses on adjusting systems and processes to respond to climate change impacts, moderating damages, and leveraging opportunities. The Intergovernmental Panel on Climate Change (IPCC) emphasizes that climate-resilient development requires integrating these two approaches.

In Australia, the climate agenda is led by the Department of Climate Change, Energy, Environment, and Water (DCCEEW), established in July 2022. The DCCEEW is responsible for formulating and coordinating policies to meet the country's climate change commitments. These commitments include the ambitious target of achieving net-zero emissions by 2050 and reducing greenhouse gas emissions by 43% compared to 2005 levels by 2030. These initiatives are crucial to ensuring that Australia progresses toward a sustainable future while balancing affordability, security, and reliability in its energy system.

Audit Scope

The ANAO audit focused on the governance strategies and arrangements of the DCCEEW to coordinate and monitor Australia's climate targets, particularly under the "Powering Australia" program.

The analysis considered the effectiveness of oversight and coordination arrangements but excluded accounting and reporting of past and future emissions.

Key issues addressed

The main issues addressed by the audit were:

1. Does the DCCEEW have risk-based oversight strategies? Does it have adequate management?

2. Is there effective coordination between climate policies and programs?

Methodology and criteria used

The methodology used included:

- Analysis of governance documents, reports, and communication strategies.
- Evaluation of public information on climate reports.
- Meetings with DCCEEW staff.

Key Findings

The audit found that:

1. The DCCEEW has partial arrangements to support the government's climate commitments, with essential plans and strategies still under development.

2. Annual reports indicate progress but do not detail specific contributions of policies toward emissions reduction.

Recommendations presented

The most relevant recommendations were:

1. Develop a strategic framework for the “Powering Australia” program to enable monitoring of actions’ impacts on climate targets.

2. Implement an information asset management policy to ensure complete and accurate records.

3. Improve risk management in the “Powering Australia” program.

4. Finalize the stakeholder communication plan, clearly defining roles and responsibilities.

5. Demonstrate how policies contribute to emissions reduction.

Best practices

The ANAO adopted a detailed analysis and monitoring approach for the “Powering Australia” plan, which encompasses investment initiatives in clean technologies such as solar, wind, and hydrogen energy, as well as improvements in energy efficiency in the transport and industrial sectors.

Using primary data, the ANAO monitors ongoing, newly initiated, and completed projects since 2022. This continuous monitoring provides a comprehensive view of progress and necessary adjustments, serving as a valuable practice for SAIs seeking rigorous, evidence-based oversight of complex climate programs.

★ Key highlight

As a management and transparency tool, the ANAO implemented a “traffic light” classification system in the “Powering Australia Tracker,” categorizing the status of each program measure on a weekly basis. This system, with color codes assigned to each measure, enables dynamic tracking:

- **Verde**: On schedule and progressing as planned.
- **Green**: In progress, but with minor delays or concerns.
- **Red**: Facing significant delays or critical issues.

This system facilitates the visualization of progress and allows for the rapid identification of critical areas, serving as a replicable practice for SAIs aiming to monitor and clearly communicate the status of projects with multiple performance indicators.

Australia – Investments by the Clean Energy Finance Corporation (CEFC)

TITLE	Investments by the Clean Energy Finance Corporation (CEFC)		
Author	*Australian National Audit Office (ANAO)*		
Country	Australia	Publication	2020
Accessed on	https://www.anao.gov.au/work/performance-audit/investments-by-the-clean-energy-finance-corporation		
Highlighted energy transition topics present in the report	Governance	Yes	
	Just and inclusive energy transition	No	
	Finance	Yes	
	Covers more than one energy transition theme (Technologies)	Yes	
	Broad assessment of the energy transition	No	

Context

The Clean Energy Finance Corporation (CEFC), established under the Clean Energy Finance Corporation Act 2012, aims to drive clean energy sector financing in Australia. With an initial capital allocation of $10 billion, deposited in a special account, the CEFC facilitates progressive investments focused on energy efficiency, low-emission technologies, and renewable energy. Since July 2018, at least half of the committed funds (amounting to $5.95 billion) must be allocated to renewable energy.

The CEFC operates under the "Investment Mandate" outlined in the legislation, with directives issued by the responsible Ministers. This mandate specifies that the CEFC seeks an average return, before operational expenses, equivalent to the five-year bond rate plus three to four percent per annum over the medium to long term. Additionally, its investment portfolio must cover a range of clean energy technologies while maintaining an acceptable aggregate risk level.

Among other requirements, the mandate instructs the CEFC to evaluate the impact of its actions on the Australian energy and financial markets, safeguard governmental reputation, and invest in technologies and products supporting renewable energy market stabilization and emerging innovative technologies. The CEFC must also allocate resources through five specific funds and programs, thereby broadening support for clean energy ventures across the country.

Audit Scope

The audit aimed to:

Evaluate the effectiveness of the CEFC's selection, contracting, and ongoing management of investments, as well as assess whether the corporation was fulfilling its legislative mandate.

The audit reviewed the financial performance of the CEFC's investment portfolio since its establishment in 2012 and analyzed the selection and management of investments by the CEFC from July 2017 to December 2019.

For externally managed green funds—aggregation programs administered by other institutions to finance environmental projects—the audit did not assess specific investment decisions. Instead, it examined how the CEFC structured its arrangements to manage risks associated with these investments.

Key issues addressed

The main issues addressed by the audit were:

1. Does the CEFC have effective arrangements in place to assess potential investments, manage, and report on the performance of its investments?

2. Is the CEFC effectively fulfilling its purpose as set out in the Clean Energy Finance Corporation Act 2012 and complying with legislative requirements and directions?

Methodology and criteria used

The methodology employed included:

- Collecting and analyzing CEFC documents related to investment policies and strategies, processes for considering, approving, or rejecting proposals, and ongoing investment management.
- Analyzing a statistically informed sample of 23 investments approved between July 2017 and December 2019, considering criteria such as the type of clean energy technology, sector, and investment instrument. The audit assessed compliance with CEFC legislative requirements and management practices for achieving the target return rate.
- Examining potential investments considered from July 2017 that did not progress to approval.
- Evaluating the performance of the CEFC's investment portfolio since its foundation in 2012.

- Conducting interviews with representatives from the Australian Renewable Energy Agency (ARENA), the Department of Industry, Science, Energy and Resources, and the Department of Finance.
- Reviewing statutory evaluations and internal audits of CEFC investments, including the implementation of recommendations and actions to address identified findings.
- Interviewing CEFC staff to gain deeper insights into internal practices and processes.

Key Findings

The audit found that:

1. The CEFC has adequate arrangements for evaluating, approving, and managing investments.
2. It has met the legal requirement to allocate at least 50% of funds to renewable technologies.
3. The CEFC has not yet achieved the medium- to long-term return rates stipulated by the Investment Mandate.
4. The corporation has largely effective risk management processes.
5. While the CEFC has facilitated increased financing for the clean energy sector, the extent of this impact remains uncertain.

Recommendations presented

The most relevant recommendations were:

1. Develop a more comprehensive statement on investment policies related to environmental, social, and governance issues, in line with Section 16 of the Investment Mandate.

2. Include a capital efficiency metric for carbon reduction as an additional indicator in annual performance statements.

3. Incorporate information on market impact and a comparison of the return rate with the Investment Mandate's benchmark average in project screenings.

4. Compare clean energy performance and leverage with other green banks.

5. Clarify, within the Investment Mandate, the allocation of up to $1 billion to the Sustainable Cities Investment Program and detail amounts assigned to different funds or programs.

6. Document procedures for calculating return rates, ensuring the traceability of data sources.

7. Inform Ministers of actions taken to meet the target return rates and associated challenges.

8. Develop a metric to estimate portfolio risk capital and include a quarterly assessment of risk levels in the Enterprise Risk Report.

Best practices

The methodology adopted in the audit was comprehensive and well-grounded, covering all necessary variables to evaluate the CEFC's efficiency in financing investments and its alignment with legislative requirements. This model can inspire other SAIs to apply holistic approaches that integrate an analysis of both legal compliance and the efficiency and impact of public investments.

★ Key highlight

A significant highlight was the long-term analysis of the CEFC's investment portfolio, spanning from the corporation's establishment in 2012. This approach provides an in-depth and deterministic perspective on the impacts of investments over time, enabling other SAIs to consider the ongoing impact of public investment policies and produce robust evidence for sustainable recommendations.

Australia - Grant Program Management by the Australian Renewable Energy Agency

TITLE	Grant Program Management by the Australian Renewable Energy Agency		
Author	Australian National Audit Office *(ANAO)*		
Country	Australia	Publication	2020
Accessed on	Highlighted energy transition topics present in the report		
Highlighted energy transition topics present in the report	Governance	Yes	
	Just and inclusive energy transition	No	
	Finance	Yes	
	Covers more than one energy transition theme (Technologies)	Yes	
	Broad assessment of the energy transition	No	

Context

The Australian Renewable Energy Agency (ARENA) is a government agency that aims to improve competitiveness of renewable energy technologies and increase the renewable energy supply in Australia.

The agency provided over USD$ 2.2 billion in funding from the australian goverment between 2012 and 2022. ARENAS's functions include: 1) provide financial assistance for research, development, demonstration, comercialization or implementation of renewable energy technologies, or for the storage and sharing of information and knowledge about renewable energy technology; e 2) collecting, analyzing, interpreting and sharing information and knowledge related to renewable energy technology and projects.

Audit Scope

A substantial amount of funding was allocated to renewable energy activities through ARENA. As ARENA approached the end of its legislated funding in 2022, it was important to provide the Parliament with assurance about the effectiveness of ARENA's grant management in improving the competitiveness of renewable energy technologies and increasing the supply of renewable energy in Australia.

The audit scope focused on the following ARENA activities:

- Strategic planning;
- Development of grant program guidelines;
- Evaluation of grant application and project selection processes;
- Management of grant funding agreements; and
- Evaluation and reporting on grant programs and organizational performance.

The audit scope did not include:

- The USD$ 200 million Clean Energy Innovation Fund, wich is primarily funded and managed by CEFC, with ARENA providing subject matter expertise and contract management assistance.
- ARENA's legislated functions unrelated to grant management, such as advising the minister and the contact between state and territorial governments and other authorities.

Key issues addressed

The objective of the audit was to evaluate the efficiency of ARENA's grant program management. To achieve this, the ANAO addressed the following questions:

1. Does grant selection support the achievement of ARENA's goals?
2. Are grant funding agreements managed effectively?
3. Does the evaluation of grant programs indicate that ARENA is meeting its goals?

Methodology and criteria used

Audit procedures included:

- Examination of ARENA documentation;
- Analysis of data from the grant management system;
- Sampling tests of grant application assessments and contract management documentation;
- Observation of the processes of grant evaluation;
- Site visits to projects funded by ARENA;
- Consideration of public submissions to the ANAO; and
- Interviews with ARENA staff.

The audit was conducted in accordance with ANAO Auditing Standards at a cost of approximately USD$ 489.600.

The following sources criteria were used to evaluate ARENA's performance..

- ARENA Strategic Plans - ARENA Corporate Plan 2018/19 – 2021/22.
- Grant guidelines and frameworks - ARENA General Funding Strategy 2018/19 – 2021/22.
- Grant application and project selection processes - Innovating Energy: ARENA's Investment Plan 2017
- The Commonwealth Grants Rules and Guidelines (CGRGs) published by the Department of Finance.
- ARENA's Internal Grant Management Framework - ARENA Business Plan 2018-19.

Main findings

1. While ARENA's grant program is wildly effective, its evaluation framework and performance reports do not clearly show that grant funding is increasing the supply and competitiveness of renewable energy in Australia beyond what would have occurred otherwise.

2. ARENA's strategic planning and grant project selection are largely aligned with its objectives. However, its performance reports framework does not provide a reliable basis to demonstrate to Parliament and the public that ARENA is achieving its goals.

3. ARENA's management of grant funding agreements is wildly effective. However, improvements are needed in managing variations and integrating electronic systems with its business processes.

4. External evaluations of ARENA since 2017 do not clearly demonstrate the extent to which ARENA's programs are impacting its legislative objectives of improving the supply and competitiveness of renewable energy in Australia.

Recommendations presented

Main recommendations for ARENA:

1. Improve reliability and integrity of the measurement framework and performance report.

2. Clearly articulate in its grants guidelines how it evaluates the additionality of project applications to better demonstrate that the projects it funds could not have proceeded without public funding.

3. Continue to integrate its grant evaluation and managing processes with its information systems to strenghthen the guarantee of its grant managment activities.

4. Improve its policies and funding variation processes, ensuring the proper cost-benefit consideration, alignment with grant program criteria and proibity in the variation decisions.

5. Implement policies and processes to effectively ensure that its performance measurement framework and its reports are completely consistent with the federal performance framework.

6. Actively evaluate and manage the conflicts of interest between the participating organizations and share any relevant conflict in the evaluation reports and materials provided to decision-makers.

Best practices

The report outlines the methodology and criteria used in the audit in its executive summary. Additionally, various methodologies were employed, including document analysis, interviews, and sampling, to understand the audit's scope and gather relevant and reliable audit evidence supporting the conclusions and recommendations.

The SAI shared the audit's findings and recommendations with the audited entity, ARENA, to confirm their relevance, accuracy, and adequacy. ARENA provided feedback on the draft report, which was incorporated and discussed by the SAI in the final report.

★ Key highlight

The audit demonstrated the SAI's rigorous analysis by applying criteria based on government laws, regulations, and strategic documents. The SAI reviewed a representative sample of 44 subsidized financing agreements, randomly selected from 290 agreements managed by ARENA, focusing on compliance with guidelines and the entity's internal assessments. Additionally, a second sample of 44 financing applications—representing 15% of the total submitted to ARENA—was evaluated, emphasizing the additionality requirement. This ensures the effective use of public resources by guaranteeing that the projects would not have been viable without state support.

Colombia - Assessment Of The Energy Transition Public Policy (2012-2022)

TITLE	**Assessment of the Energy Transition Public Policy (2012-2022)** *Evaluación a la política pública de transición energética (2012 – 2022)*		
Author	*Contraloría General de la República (CGR)*		
Country	Colombia	Publication	2023
Accessed on	https://www.contraloria.gov.co/		
Highlighted energy transition topics present in the report	Governance	Yes	
	Just and inclusive transition	Yes	
	Finance	Yes	
	Covers more than one Thematic Area (Technologies) Yes	Sim	
	Broad assessment of the energy transition	Yes	

Context

The energy transition refers to the path towards cleaner energy supply and consumption, contributing to the planet's decarbonization by reducing greenhouse gas (GHG) emissions. Since the adoption of the United Nations Framework Convention on Climate Change in 1992, countries have committed to stabilizing GHG concentrations in the atmosphere. The 2015 Paris Agreement reinforced this commitment by establishing goals such as access to affordable and clean energy, promoting sustainable cities and communities, ensuring responsible production and consumption, and fostering climate action.

In this context, the energy transition entails significant changes in energy production, distribution, and consumption models, requiring effective public policy actions. Evaluating the implemented initiatives and their impact on the mining-energy sector, as well as their correlation with macroeconomic variables like GDP, income, and employment, is critical. In Colombia, various reforms have been adopted, including the biofuels program and Ecopetrol's 2040 vision. Expectations for progress in hydrogen development, electric mobility, and the electrification of sectors historically dependent on fossil fuels are also on the rise. While progress has been made, the energy transition is still in its early stages and requires further actions to consolidate achievements.

Audit Scope

The audit aimed to assess Colombia's public policies related to the energy transition by analyzing their level of maturity and participation in public agendas.

Key issues addressed

The main questions analyzed by the CGR of Costa Rica in the reviewed document were:

1. What initiatives has Colombia promoted for the energy transition?
2. What results and achievements have been reached so far?
3. What strategic areas should the energy transition policy strengthen?

Methodology and criteria used

The CGR applied the Guide for the Evaluation of Public Policies (CGR-2017), which uses an approach based on actors, resources, and institutions. This methodology acknowledges the complexity of public policies by considering the influence of various stakeholders.

The public policy analysis under this model involves:

1. **Identification of Stakeholders**: Mapping the key stakeholders involved in the public policy, including governmental and non-governmental actors (civil organizations, the private sector, international organizations, etc.).
2. **Resources and Power**: Understanding the resources each stakeholder possesses and how they use them to influence the formulation, implementation, and evaluation of public policies. These resources can include financial, human, informational, or political influence.
3. **Institutions**: Considering the institutional framework within which stakeholders operate, including laws, norms, regulations, and informal practices that shape the rules of public decision-making.

4. **Interaction Dynamics**: Analyzing how stakeholders interact based on their interests and available resources. These interactions can be cooperative or conflictive and play a crucial role in policy outcomes.

This model provides a deeper and more realistic understanding of how public policies are developed and implemented by recognizing the social and political context's influence on their performance.

The policy evaluation was based on key documents and diagnostics developed by government entities, such as the Roadmap[1] for a Just Energy Transition developed by the government and the Indicative Climate Change Management Plan (PIGCCme).

Main findings

1. Over 200 projects were initiated between 2012 and 2023, but delays in execution and delivery affected their impact.

2. Inequalities in electricity services persist, particularly in Non-Interconnected Zones (ZNI).

3. The energy transition requires more than infrastructure; efficiency and sustainability must be prioritized.

4. Lack of coordination among sectors hampers progress in the transition.

5. The country achieved only 13% of its 2023 goals.

6. The government seems to underestimate the relevance of oil, overlooking its near-term necessity.

7. The assessment of the transition's success is limited to greenhouse gas mitigation, neglecting other economic factors.

[1] Hoja de Ruta para la Transición Energética Justa - TEJ. CONPES 4075 de 2022.

8. Legal uncertainties and lack of planning undermine progress in the transition.

9. Government proposals focus on phasing out coal without considering the economic realities of emerging countries.

Recommendations presented

10. The Ministry of Energy is advised to ensure the timely execution and delivery of the 200+ projects initiated between 2012 and 2023 to maximize their impact on the energy transition.

11. It is suggested to implement specific policies to address inequalities in electricity services, particularly in Non-Interconnected Zones (ZNI), ensuring all communities have access to quality energy.

12. The energy transition should prioritize efficiency and sustainability, ensuring new infrastructure meets high environmental performance standards.

13. Greater coordination among the sectors involved in the energy transition is recommended to facilitate collaboration and avoid redundant efforts.

14. Energy transition goals should be reassessed, given the 13% progress as of 2023, and a more robust plan should be established to achieve significant results.

15. The government should re-evaluate the role of oil in the context of the energy transition, considering its short-term necessity.

16. The definition of success for the energy transition should be expanded to include economic and social factors alongside greenho use gas mitigation.

17. Legal certainty and planning in the energy sector must be improved to create a more favorable environment for investments and policy development.

18. Government proposals should consider the economic realities of emerging countries and focus not only on eliminating coal but also on ensuring a balanced transition.

19. The Ministry of Energy is encouraged to implement specific performance indicators to monitor the effectiveness of energy transition policies, particularly regarding vulnerable communities.

Best practices

The CGR has developed a guide for evaluating public policies: the Guide for the Evaluation of Public Policies, CGR 2017: Towards a Model of Operational Public Policy Analysis. This guide adopts an approach centered on stakeholders, their resources, and institutions, allowing for a deeper and more realistic understanding of the interactions among the various actors involved in the formulation and implementation of public policies.

★ Key highlight

This report stands out for its comprehensive analysis of governmental actions and regulatory frameworks related to the energy transition. It provides a detailed diagnosis of Colombia's level of maturity in addressing the challenges of the transition. The analysis goes beyond actions aimed at mitigating greenhouse gas emissions by encompassing other critical dimensions, such as energy security and reliability, which directly impact economic development. The depth and scope of the evaluation offer valuable insights for other Supreme Audit Institutions (SAIs) in designing their own audits.

Costa Rica - Challenges of the energy transition from the public finance perspective

TITLE	**Challenges of the Energy Transition From the Public Finance Perspective** *(Desafíos de la transición energética desde la perspectiva de la hacienda pública)*		
Author	*Contraloría General de la República (CGR – Costa Rica)*		
Country	Costa Rica	Publication	2021
Accessed on	https://cgrfiles.cgr.go.cr/publico/docsweb/documentos/publicaciones-cgr/aspectos-funcion-publica/aportes-ejercicio-legislativo-desafios-2022-2026.pdf		
Highlighted energy transition topics present in the report	Governance	Yes	
	Just and inclusive transition	Yes	
	Finance	Yes	
	Covers more than one Thematic Area (Technologies)	Yes	
	Broad assessment of the energy transition	Yes	

Context

Costa Rica has set the goal of achieving net-zero emissions by 2050, aligning with international agreements and public policy instruments. The energy transition is a complex process that presents significant opportunities for the country's development in the 21st century, especially in the post-pandemic period. This transition is driven by three main factors: climate change as a transformative force, the emergence of new technologies and consumption habits, and the need to address structural issues in the energy sector, which accounts for 67% of the country's CO2-equivalent emissions.

Audit Scope

The audit focused on:

1. The determinants of the energy transition, including climate change as a transformative trend, the disruptive environment in the energy sector, and the challenges to achieving an efficient transition.

2. The challenges to public finance arising from the transition, focusing on the implementation of public policy, the exercise of institutional competencies, and the efficient management of public resources.

3. Hydroelectric and wind projects financed through trust funds, assessing whether the financing options minimize costs and avoid the creation of "stranded assets," such as potentially obsolete fossil fuel infrastructure. This analysis highlighted the need to optimize resources and ensure that financing decisions align with the objectives of the energy transition.

Key issues addressed

The main questions analyzed by the CGR of Costa Rica in the reviewed document were:

1. What is the role of public policies in Costa Rica's energy transition?
2. Are the energy sector stakeholders fulfilling their roles adequately for an efficient transition?
3. How can the efficiency of public funds required for the energy transition be maximized?

Methodology and criteria used

The CGR conducted a comprehensive survey through semi-structured interviews with 33 representatives from 23 organizations, 29 of which were government entities, as well as independent consultants and a university. Additionally, workshops were organized with 18 participants from 16 organizations, including government representatives, the energy sector, and civil society.

The CGR's analyses were based on national legislation that defines institutional roles, using existing public policies as comparison criteria. The evaluation focused on the adequacy of the targets set for the energy transition and the need to create indicators that allow monitoring the implementation of policies, especially those outlined in the National Energy Plan 2015-2030.

The main laws in the sector were evaluated, starting with Law 449/1949, which established the ICE (Instituto Costarricense de Electricidad), the main actor re-

sponsible for meeting the country's electricity demand, up to Law 39.220/2015, which regulated distributed generation for self-consumption, and including Law 7.200/1990, which authorized private actors to generate electricity.

Special attention was given to identifying gaps, considering the need to set targets that are scientifically and technically grounded, as well as developing action plans to optimize the use of renewable resources.

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Main findings

1. Lack of a systemic design in the energy sector, leading to non-optimized investments.

2. Identification of inefficiencies in the energy sector's functioning, stemming from partial modifications to legislation and the lack of regulatory adaptation to technological changes.

3. Improving the functions of key actors is essential for an efficient energy transition, especially in managing costs and benefits.

4. The independence of the system operator (CENCE) is crucial to ensuring impartiality.

5. Adapting regulation is crucial to respond to changes in the energy environment.

6. Public policies should be supported by technical studies that quantify the expected impact.

7. A need for USD 24 billion in investments to implement the transportation component of the Decarbonization Plan.

Recommendations presented

1. Promote awareness of the urgency of a sustainable development model, emphasizing the role of energy in this transformation.

2. Consider the impacts on vulnerable populations, ensuring an inclusive development model.

3. Define a unique path for the transition, controlling changes according to the country's interests.

4. Identify and adapt the necessary regulatory instruments for the transition.

5. Enact a framework law for the energy system with a forward-looking perspective, developed in a participatory manner.

6. Turn public policies into specific projects.

7. Integrate sector actors through collaborative leadership models.

8. Increase the electrification of the economy, discouraging investments that may delay transition goals.

Best practices

The opinion report provides a comprehensive diagnosis of the challenges faced by institutions to ensure a just, inclusive, and economically viable energy transition. It focuses on three main pillars: public policies, institutional competencies, and efficient public resource management, serving as a reference for future audits.

★ Key highlight

The document stands out for conducting a gap analysis, identifying discrepancies and suggesting solutions to the challenges of the energy transition. The report emphasizes the importance of recognizing Costa Rica's comparative advantage over other economies, promoting social awareness of the need to shift towards a prosperous, sustainable, and inclusive development model.

USA – Airport Infrastructure: Selected Airports' Efforts to Enhance Electrical Resilience

TITLE	**(AIRPORT INFRASTRUCTURE: Selected Airports' Efforts to Enhance Electrical Resilience)**		
Author	*U.S. Government Accountability Office (GAO)*		
Country	USA	Publication	2023
Accessed on	https://www.gao.gov/products/gao-23-105203		
Highlighted energy transition topics present in the report	Governance	Yes	
	Just and inclusive energy transition	No	
	Finance	Yes	
	Covers more than one energy transition theme (Technologies)	Yes	
	Broad assessment of the energy transition	No	

Context

Commercial airports in the United States play a crucial role in the transportation of passengers and cargo, handling around 847 million people and 105 million tons of cargo in 2022. To keep operations running smoothly, these airports rely on a continuous and reliable power supply, essential for air traffic control and the safe and efficient operation of terminals and runways. The responsibility for the resilience of airport electrical systems is shared between the Federal Aviation Administration (FAA) and the airports themselves. The FAA, responsible for ensuring the safe operation of airports and the National Airspace System (NAS), requires that airport facilities have robust primary and backup power sources to guarantee the continuous and safe operation of systems.

In recent years, power outages at major U.S. airports have caused significant impacts, highlighting the importance of efforts to strengthen electrical resilience. A notable example occurred in February 2023, when Terminal 1 at John F. Kennedy International Airport in New York suffered an outage that led to flight cancellations and delays, impacting terminal services. Another case was an electrical failure of about 11 hours at Hartsfield-Jackson International Airport in Atlanta in 2017, which resulted in the cancellation of approximately 1,200 flights and caused an estimated loss of $50 million to one of the airlines.

Audit Scope

The audit aimed to:

- Analyze power outages since 2015 and actions taken to mitigate future risks.
- Examine measures adopted by the Federal Aviation Administration (FAA) and airports to strengthen electrical infrastructure and ensure energy resilience.

Key issues addressed

The main issues addressed by the audit were:

1. What is the extent of power outages at U.S. airports from 2015 until the time of the audit?

2. What actions have airports taken to improve the resilience of their electrical systems?

3. What measures has the FAA implemented to support electrical resilience at airports?

Methodology and criteria used

To conduct the audit on electrical resilience at U.S. airports, the U.S. Government Accountability Office (GAO) employed a structured and multi-method approach that included interviews, field visits, document reviews, and financial data analysis.

The GAO interviewed representatives from 41 commercial airports of various sizes, covering 72% of passenger traffic in the country. The airports were selected based on criteria such as passenger volume and cargo movement recorded in 2019, ensuring a representative sample from different hub sizes. To complement the interviews, the GAO conducted a follow-up survey to understand the extent of power outages experienced by these airports. The survey was answered by 30 out of the 41 airports, representing 53% of total passenger traffic.

In addition to the interviews and survey, the GAO conducted on-site visits to nine of the selected airports to directly observe energy infrastructure and operations. These data were supplemented by reviews of applicable statutes and regulations, as well as an analysis of funding information to identify examples of projects related to electricity and resilience. The GAO also consulted authorities from the

Federal Aviation Administration (FAA) and experts from the energy and airport sectors, including the National Renewable Energy Laboratory (NREL) from the Department of Energy (DOE) and the Transportation Security Administration (TSA) from the Department of Homeland Security (DHS), to understand how these entities support electrical resilience efforts at airports.

To characterize the responses obtained during interviews, written questions, and the online survey, the GAO used standards to quantify the responses from airports, defining the following parameters:

- "The majority": three-quarters or more of the airports provided information on the topic.
- "Many": between half and three-quarters of the airports provided information.
- "Some": between one-quarter and half of the airports provided information.
- "Few": fewer than one-quarter of the airports provided information.

To deepen the analysis of FAA actions supporting the electrical resilience of airports, documents from the Airport Improvement Program (AIP), guidance on passenger facility charge (PFC) rates, and FAA advisory circulars, such as emergency planning guidelines, were reviewed. The GAO also analyzed project descriptions funded by AIP and PFC approvals from fiscal years 2015 to 2022, identifying initiatives that may have contributed to electrical resilience at airports.

In addition, the GAO consulted previous reports such as the "Disaster Resilience Framework: Principles for Analyzing Federal Efforts to Facilitate and Promote Resilience to Natural Disasters", and reports from renowned entities such as the National Academies of Sciences, Engineering, and Medicine, and the Transportation Research Board. Interviews were also conducted with stakeholders from the sector, including representatives of Airports Council International-North America, as well as experts from academia, state governments, and energy consultants, to provide a broad perspective on initiatives and challenges related to electrical resilience at airports. These consultants were selected based on previous research and the GAO's experience in infrastructure audits.

This comprehensive approach enabled the GAO to collect representative data and examples of current electrical resilience practices at U.S. airports, offering a robust and detailed view of the current landscape.

Main findings

The participants in the GAO's survey and interviews indicated:

1. Of the 30 airport authorities interviewed, 24 reported unplanned power interruptions between 2015 and 2022, totaling 321 incidents.

2. Eleven airports recorded six or more interruptions during this period, affecting essential operations and airport systems.

3. The study observed that not all airports provided detailed data on the interruptions, with some cases only providing estimates.

Recommendations presented

The recommendations include:

1. Regularly assess electrical infrastructure.

2. Implement improvement projects to ensure resilience.

3. Invest in backup systems and independent microgrids.

4. Access federal funding for electrical resilience projects, with support and guidance from the FAA.

Best practices

The work carried out by the U.S. Government Accountability Office (GAO) demonstrates a clear alignment between auditing needs and control objectives, with a direct focus on the essential aspects of electrical resilience at airports. The adopted approach is objective and centers on providing practical and measurable responses, making it easier to identify critical areas and contribute to the continuous improvement of infrastructure. This practice of focused direction and operational relevance offers an effective methodological model, which can be replicated by other Supreme Audit Institutions (SAIs) in audits of essential infrastructure systems.

Dulles International Airport - USA
Font: Adobe Stock

★ Key highlight

The methodology used is worth highlighting due to its high statistical representativeness and practical, comprehensive approach. By interviewing authorities from 41 airports of different sizes—representing 72% of passenger traffic in the U.S.—the GAO captured a broad view of the energy situation. Additionally, on-site visits were made to nine of these airports to observe the energy infrastructure and operations in person, providing a concrete analysis of local conditions.

Another highlight is the inclusion of interviews with representatives from the FAA, the National Renewable Energy Laboratory (NREL) from the Department of Energy (DOE), and the Transportation Security Administration (TSA), ensuring a collaborative view of electrical resilience efforts and coordination between airports and federal agencies.

USA – Federal Buildings: Capital Access and market options are key challenges facing GSA's Sustainability Efforts

TITLE	Federal Buildings: Capital Access and Market Options Are Key Challenges Facing GSA's Sustainability Efforts		
Author	*U.S. Government Accountability Office (GAO)*		
Country	USA	Publication	2023
Accessed on	https://www.gao.gov/products/GAO-23-105905		
Highlighted energy transition topics present in the report	Governance	Yes	
	Just and inclusive energy transition	No	
	Finance	Yes	
	Covers more than one energy transition theme (Technologies)	No	
	Broad assessment of the energy transition	No	

Context

The General Services Administration (GSA) is responsible for more than 371 million square feet of space in 8,600 buildings, supporting the activities of various federal agencies. These buildings consume a significant amount of energy and are responsible for a considerable share of the federal government's greenhouse gas emissions.

Since the early 2000s, several laws and executive orders have established sustainability goals, focusing on energy and water efficiency, as well as reducing greenhouse gas emissions. In 2021, an executive order set new long-term goals, including obtaining electricity from carbon-free sources and reducing emissions to net-zero levels.

Federal legislation also emphasizes the use of performance contracts for projects promoting sustainability in federal buildings.

Audit Scope

The GAO was asked to review the GSA's efforts to implement sustainability measures in its building portfolio.

The work included analyzing laws, executive orders, GSA policies, facility standards, and sustainability plans, as well as reviewing GSA reports from 2018 to 2021 related to sustainability goals.

Staff from the GSA headquarters and each of its 11 regional offices were interviewed.

Key issues addressed

The main issues addressed by the audit were:

1. What are the main efforts by the GSA to incorporate sustainable practices?
2. What is the recent progress of the GSA toward meeting the federal building sustainability goals?
3. What challenges does the GSA face in meeting future sustainability goals at the government level?

Methodology and criteria used

To describe the GSA's sustainability efforts and the challenges in meeting the established goals, relevant laws, government policies, facility standards, and sustainability plans were reviewed. Additionally, interviews were conducted with GSA staff from different regions.

Although there is no uniform definition, the report considers sustainability as a set of legal requirements and executive orders aimed at minimizing environmental impacts related to the construction and operation of buildings.

The audit focused on sustainability goals related to the design, construction, renovation, and operation of buildings under GSA's responsibility.

To assess the reliability of the data, GSA documentation was reviewed, and staff were interviewed about the systems where data was stored and the controls in place to ensure the accuracy of the data received.

Main findings

The audit found that:

1. The lack of access to capital was identified as a significant challenge to meeting federal sustainability goals.

2. The scale and scope of the projects required to achieve net-zero emissions by 2045 will require resources beyond those historically available.

3. Employees from almost all 11 GSA regions expressed doubts about the ability to meet these goals.

4. The GSA may need to provide initial funding to enable performance contracts for energy savings.

Recommendations presented

The most relevant recommendations were:

1. Provide regular initial funding to make energy savings performance contracts feasible.

2. Consider utilizing resources from the Inflation Reduction Act whenever possible

Best practices

The audit highlights the importance of reviewing and considering a comprehensive history of policies and guidelines, including laws, executive orders, and internal guidance that define sustainability goals for public buildings. This type of detailed analysis allows for a better understanding of the regulatory framework that guides sustainability practices, identifying current goals and best practices adopted over time.

★ Key highlight

The review of the GSA's data storage systems and the controls applied ensured data integrity, which strengthened the basis for the audit's recommendations and conclusions. This practice can serve as a model to improve the quality of sustainability audits in other institutions.

The audit emphasized the importance of the accuracy and reliability of the data used to monitor sustainability efforts.

USA - State And Local Efforts to Reduce Greenhouse Gas Emissions from Vehicles

TITLE	**State and Local Efforts to Reduce Greenhouse Gas Emissions from Vehicles**		
Author	*U.S. Government Accountability Office (GAO)*		
Country	USA	Publication	2023
Accessed on	https://www.gao.gov/assets/gao-23-106022.pdf		
Highlighted energy transition topics present in the report	Governance	Yes	
	Just and inclusive energy transition	No	
	Finance	Yes	
	Covers more than one energy transition theme (Technologies)	No	
	Broad assessment of the energy transition	No	

Context

According to the Environmental Protection Agency (EPA), the transportation sector is the largest source of greenhouse gas emissions in the United States, with transportation activities accounting for 29% of total emissions in 2021. Most of these emissions occur on the nation's road network, which is largely managed and operated by state and local governments.

The Federal Highway Administration (FHWA) provides funding to state departments of transportation (DOTs) through the federal highways program to maintain, construct, and improve the country's surface transportation. State transportation departments make investment decisions in coordination with other entities such as metropolitan planning organizations (MPOs), which are policy boards responsible for carrying out the transportation planning process in metropolitan areas within a state.

According to FHWA, state departments and MPOs play a crucial role in implementing activities to reduce greenhouse gas emissions related to transportation, including roadway emissions.

Audit Scope

The audit, initiated by the Consolidated Appropriations Act of 2022, aimed to assess the extent to which states and metropolitan planning organizations collect information on the level of greenhouse gas emissions related to transportation. The objectives included:

- Assessing how state DOTs and MPOs estimate and analyze roadway greenhouse gas emissions.
- Verifying whether state transportation departments consider emissions during project development phases.
- Identifying the use of emission reduction goals and the main challenges faced by local entities.

Key issues addressed

To reach the conclusions on the audit's objective, the GAO investigated the following questions:

1. To what extent do states and metropolitan planning organizations collect performance data on greenhouse gas emissions related to transportation?

2. Do state departments of transportation use greenhouse gas emission estimates in the project development phase?

3. What methods are used by selected departments and organizations to estimate greenhouse gas emissions on roadways?

4. How do these departments and organizations assess the impact of transportation investments on greenhouse gas emissions?

5. How do departments and organizations set greenhouse gas emissions reduction goals for roadways?

Methodology and criteria used

The audit was conducted in accordance with accepted government auditing standards, ensuring adequate evidence for the conclusions.

The GAO reviewed the 2018 research from the National Cooperative Highway Research Program (NCHRP) on state transportation departments and greenhouse gas emissions, focusing on project planning and development practices.

Interviews were conducted with 10 DOTs and 10 MPOs, selected based on emission reduction policies, population, and area. The analysis included technical documents, state regulations, and interviews with federal agencies and industry associations.

Finally, the report was reviewed by state transportation departments and the Environmental Protection Agency (EPA), who provided technical comments that were incorporated into the final document.

Main findings

The audit found that:

1. Selected state and local entities use different methods to analyze the impact of transportation investments on emissions on roads.

2. Few selected state and local entities have set reduction targets for greenhouse gas emissions on roads.

3. Some selected departments and organizations have set reduction targets in response to state and regional initiatives.

4. Departments and organizations have identified several challenges in achieving reduction targets.

Recommendations presented

The most relevant recommendations [2] were:

1. Improve the collection and standardization of data on emissions in the transportation sector.

2. Strengthen alignment between states and MPOs regarding the use of reduction targets.

3. Identify unified approaches for assessing the environmental impact of transportation investments.

Best practices

The GAO shared its preliminary findings with the Department of Transportation (DOT) and the Environmental Protection Agency (EPA) to ensure accuracy and relevance. Technical comments were incorporated into the final report, contributing to the acceptance of the findings and the quality of the final document.

The audit used a robust approach, combining techniques such as data analysis, interviews with entities, and sampling to ensure sufficient and reliable evidence. This methodology enhances the robustness of the findings and makes the audit model replicable in other jurisdictions.

The selection of states for interviews followed criteria of geographic diversity, emission policies, and population, which provided a comprehensive view of efforts in different local contexts.

[2] Hoja de Ruta para la Transición Energética Justa - TEJ. CONPES 4075 de 2022.

★ Key highlight

The report revealed that few states and metropolitan planning organizations have set concrete targets to reduce greenhouse gas emissions related to transportation, even though the sector is the main source of emissions in the U.S.

Despite the identified challenges, the audit highlighted pioneering initiatives in some states that align transportation policies with environmental goals, helping to reduce the climate impacts of the road sector.

Additionally, the report emphasized the urgent need to standardize data collection and strengthen cooperation between states and regions to ensure that transportation investments take emission reduction goals into account.

USA - Climate Change: Oversight of Federal Greenhouse Gas Emissions Reduction Efforts

TITLE	**Climate Change: Oversight of Federal Greenhouse Gas Emissions Reduction Efforts**		
Author	U.S. Government Accountability Office (GAO)		
Country	USA	Publication	2022
Accessed on	https://www.gao.gov/products/gao-23-106062		
Highlighted energy transition topics present in the report	Governance	Yes	
	Just and inclusive energy transition	No	
	Finance	No	
	Covers more than one energy transition theme (Technologies)	Yes	
	Broad assessment of the energy transition	Yes	

Context

Each year, the United States federal government reports spending billions on initiatives to combat climate change, focusing on reducing greenhouse gas emissions, such as carbon dioxide. The Inflation Reduction Act of 2022 allocated additional resources to these initiatives, but the full implementation of the measures will be gradual. Reducing emissions can mitigate the magnitude of climate change, including investments in carbon capture and storage (CCS) technologies and energy efficiency.

The U.S. Global Change Research Program (USGCRP) and the National Academies of Sciences, Engineering, and Medicine project that the impacts and costs of natural disasters will rise due to the intensification of extreme weather events. Therefore, international cooperation and oversight of domestic efforts are crucial.

Audit Scope

The audit aims to evaluate federal efforts to reduce greenhouse gas emissions, considering technology, consumption, energy efficiency, as well as national and international policies.

Key issues addressed

The main issues addressed by the audit were:

1. Which technological efforts are being prioritized to reduce greenhouse gas emissions?

2. What energy efficiency actions are being implemented?

Methodology and Criteria Used

- Consultation with economists and the National Academies.
- Evaluation of specialized documentation from the U.S. Global Change Research Program and the National Academies on the impacts and costs of natural disasters.
- Assessment of national and international public policies related to combating climate change.
- Review of current technological and energy efficiency efforts in the country.

Main findings

The audit found that:

1. The limited production of advanced biofuels results in a modest reduction in greenhouse gas emissions.

2. Agencies monitored the industry's progress in reducing pollution from coal plants but faced challenges in implementing regulations to reduce methane emissions in the oil and gas sector.

3. Greenhouse gases already present in the atmosphere will continue to affect the climate system for decades, making limiting the federal government's fiscal exposure a challenge.

Recommendations presented

GAO recommends that Congress and the Department of Energy:

1. Implement a mechanism to increase oversight and accountability over carbon capture and storage (CCS) projects.

2. Improve the selection and management of CCS projects, ensuring a more consistent approach.

3. Establish a strategic geoengineering plan to mitigate climate change.

4. Consider sustainability criteria in the acquisition of electric vehicles at the government level.

5. Require gas capture plans on federal lands by the Bureau of Land Management (BLM).

Best practices

GAO conducted a comprehensive review of national and international documents, in addition to establishing partnerships with academic institutions, which contributed to a more robust analysis of efforts to reduce greenhouse gas emissions.

★ Key highlight

The audit highlighted the importance of an integrated analysis of different technologies and policies, allowing for a comprehensive understanding of federal efforts to reduce emissions.

Honduras - Performance Audit on Climate Change, Conducted at the Secretariat of State in the Energy Office (SEN)

TITLE	**Performance Audit on Climate Change, conducted at the Secretariat of Energy (SEN)** *(Auditoría de Desempeño Sobre el Cambio Climático Practicada a la Secretaría de Estado en el Despacho de Energía (Sen)*	
Author	Tribunal Superior de Cuentas (TSC)	
Publication	2022	
Accessed on	https://www.tsc.gob.hn/index.php/informes-de-auditoria/informes-de-auditorias-de-gobierno-central-instituciones-descentralizadas-y-desconcentradas-autonomas-y-semi-autonomas/desarrollo-economico-recursos-naturales-ambientales-y-culturales/	
Highlighted energy transition topics present in the report	Governance	Yes
	Just and inclusive transition	No
	Finance	No
	Covers more than one Thematic Area (Technologies)	No
	Broad assessment of the energy transition	Yes

Context

Honduras ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1995, committing to climate change mitigation and adaptation actions. The audit highlighted that human activities have intensified the greenhouse effect, increasing socioeconomic vulnerability and directly impacting food security, infrastructure, and other climate-sensitive sectors such as agriculture and hydropower energy.

Audit Scope

The audit aimed to assess the actions of the State of Honduras regarding governance and the commitments made under the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement, specifically in relation to climate change.

The analysis was conducted across various entities with direct responsibilities on the matter, such as the Secretariat of Natural Resources and Environment (SERNA), the Secretary of State in the Energy Office (SEN), the National Institute for the Conservation and Development of Forests, Protected Areas, and Wildlife (ICF), the Secretary of State in the Finance Office (SEFIN), the Secretary of State in the Agriculture and Livestock Office (SAG), and the Secretary of State in the Health Office (SESAL).

These institutions were selected based on a prior assessment that identified the priority entities for climate change management, aligned with national adaptation and mitigation commitments. The audit covered the period from 2018 to 2022.

The audit did not include an evaluation of efficiency and cost-effectiveness, as there was insufficient information on indicators and climate finance control to allow for this analysis. Additionally, the topics of vulnerability, natural disaster management, and food security were excluded, as specific audits for these issues are planned for future stages.

Key issues addressed

The main issues addressed by the audit were:

1. Is climate governance in Honduras effective?
2. Effectiveness of climate governance bodies.
3. Effectiveness of institutional management for climate governance.
4. Efficiency of climate monitoring and follow-up actions.
5. Have the policies and instruments for climate commitments been effective?
6. Has the country adequately institutionalized climate finance?
7. Effectiveness of climate investment actions.
8. Organization and monitoring of climate finance.

Methodology and criteria used

Standard techniques and tools were applied for the development of this audit.

Interviews, inquiries, meetings, and consultations were conducted with staff and collaborators from the institutions, allowing for direct information gathering about the actions of these entities.

A detailed analysis of documents and relevant legal frameworks was also carried out, along with the application of performance audit methodologies. Among them, stakeholder analysis, SWOT analysis (Strengths, Weaknesses, Opportunities, and Threats), and the Risk Verification Diagram (RVD) were highlighted. Ad-

ditionally, targeted questionnaires were applied to specifically assess the climate change management carried out by the mentioned institutions.

To obtain documentary evidence, various documents were reviewed, including plans, strategies, programs, regulations, and checklists on climate change from each of the audited institutions. This review helped identify the instruments and guidelines adopted to address the climate issue.

Finally, physical evidence was gathered through site visits, observations, and on-site inspections, which provided a practical and visual understanding of the activities and processes involved in the actions of the audited institutions.

Key Findings

The audit found that:

1. Absence of a legal framework that defines responsibilities for climate actions.

2. Insufficient trained technical staff to carry out climate activities.

3. Inadequate national financial resources to implement the planned actions.

These deficiencies hinder the full implementation of climate actions and the achievement of the target of reducing GHG emissions by 9% in the energy sector, as outlined in the Nationally Determined Contributions (NDCs).

Recommendations presented

The most relevant recommendations were:

1. Create a unit within the Secretary of State in the Energy Office (SEN), with specific responsibilities regarding climate change.

2. Secure financial resources to carry out climate adaptation and mitigation actions.

3. Hire the necessary technical personnel for climate actions in the energy sector.

4. Collaborate with the Secretariat of Natural Resources and Environment (SERNA) in the creation of the NDCs Action Plan, with goals and deadlines.

5. Establish inter-institutional coordination mechanisms for the climate issue in the energy sector.

6. Support the National Institute for the Conservation and Development of Forests, Protected Areas, and Wildlife (ICF) in implementing the Nationally Appropriate Mitigation Actions (NAMA) for efficient stoves, aiming to reduce firewood consumption and deforestation.

7. Define strategic adaptation guidelines for the National Electric Energy Company (ENEE).

Best practices

The audit adopted a structured methodology, integrating interviews, document analysis, and performance tools such as SWOT analysis and the Risk Verification Diagram, which provided a detailed view of climate governance in Honduras. The on-site visits enhanced the accuracy of the collected evidence, contributing to a practical understanding of the institutional actions on the issue.

Tegucigalpa - Honduras
Font: Adobe Stock

★ Key highlight

The focus on governance conditions and the effectiveness of Honduras' climate finance instruments stood out as an innovative element. This approach model could serve as a reference for other Supreme Audit Institutions (SAIs) in audits on climate commitments.

India - Assessment of the Environmental Impact due to Mining Activities and their mitigation at Coal India Limited and its Subsidiaries

TITLE	**Assessment of Environmental Impact due to Mining Activities and its Mitigation in Coal India Limited and its Subsidiaries**		
Author	Comptroller and Auditor General of India (CAG)		
Country	India	Publication	2019
Accessed on	https://cag.gov.in/uploads/download_audit_report/2019/Report_No_12_of_2019_Assessment_of_Environmental_Impact_due_to_Mining_Activities_and_its_Mitigation_in_Coal_India_Limited_and_its_Subsidiaries.pdf		
Highlighted energy transition topics present in the report	Governance	Yes	
	Just and inclusive energy transition	Yes	
	Finance	Yes	
	Covers more than one Thematic Area (Technologies)	No	
	Broad assessment of the energy transition	No	

Context

Coal is a fossil fuel primarily composed of carbon, and its extraction in India predominantly occurs through open-pit mining, but also in closed mines. Open-pit mines have a profound impact on the environment, disfiguring the landscape and compromising air quality in the exploited regions.

The coal mining process involves several stages, such as drilling, blasting, loosening coal seams, and the extraction and transportation of the mineral to railway branches or processing units.

Coal extraction generates a series of environmental and social impacts, including air, noise, and water pollution, as well as soil degradation and adverse effects on biodiversity. In India, much of the coal reserves are located in watersheds with significant forest cover and biodiversity-rich habitats, where indigenous communities also reside.

In addition to this audit focused on mining, India conducts sectoral audits in areas such as energy management in railways and the actions of the state energy efficiency agency. These audits are important contributions to the country's energy governance, highlighting energy efficiency as a key pillar for sustainable energy transition.

Audit Scope

The performance audit analyzed 41 mines and 2 washery units of Coal India Limited (CIL), covering the period from 2013/2014 to 2017/2018. The sample included both underground and open-pit mines, with a focus on areas more susceptible to environmental damage.

The audit aimed to assess the adequacy and effectiveness of actions taken by state-owned coal companies to mitigate critical environmental impacts such as pollution and the degradation of mined areas.

It also sought to examine the effectiveness of measures adopted to mitigate land degradation, land reclamation, hazardous substance management, Corporate Social Responsibility (CSR), and occupational health and safety issues affecting environmental aspects.

Performance was evaluated according to Indian environmental legislation, including the Environmental Protection Act of 1986 and CIL's Environmental Policy of 2012.

Key issues addressed

The main issues addressed by the CAG in the analyzed document were:

1. Did CIL and its subsidiaries comply with environmental regulations as required by the Environmental Protection Act?

2. Were the environmental mitigation actions adopted effective?

3. Does CIL have an adequate monitoring mechanism for environmental control?

Methodology and criteria used

To conduct the audit, the CAG of India held an initial conference with the management of CIL and its subsidiaries, during which the scope and objectives of the audit were discussed. Relevant documents were reviewed at headquarters, operational mines, and processing units, resulting in preliminary observations sent to management for feedback. Preliminary findings were also discussed. The draft audit report was sent to the ministry for consideration.

The performance of CIL and its subsidiaries was evaluated based on various legal and regulatory criteria, including the Environmental Protection Act, the Water Cess Act, and the Public Liability Insurance Act. Standards set by the Bureau of Indian Standards, CIL's Environmental Policy, guidelines for environmental personnel in mines, and mine closure guidelines were also applied. The audit took into account environmental impact assessments, environmental management plans, and conditions stipulated by the Ministry of Environment, Forests, and Climate Change (MoEF&CC), as well as specific action plans for sensitive areas such as Raniganj and Jharia.

Main findings

The audit found that:

1. Some subsidiaries did not have approved environmental policies, undermining operational consistency.

2. There were several instances of non-compliance with regulations, despite the use of clean coal technologies.

3. Subsidiaries followed diverse and non-standardized practices.

4. Production exceeded the allowed limits, including operations without the necessary environmental licenses.

5. Corporate social responsibility spending was only 41% of the required amount.

6. Inadequate control of underground fires, putting lives and the environment at risk.

7. Solar energy targets were not met.

8. There were discrepancies in the workforce across subsidiaries.

9. Monitoring was deemed inadequate, with no outsourced environmental audits.ado, sem auditorias ambientais terceirizadas.

Recommendations presented

The most relevant recommendations were:

1. CIL should implement an environmental policy approved by the Board of Directors.
2. Pollution control actions and tree planting should be carried out simultaneously.
3. A uniform policy for the use of fly ash should be established.
4. Optimize corporate social responsibility spending for local sustainable development.
5. Accelerate corrective actions to mitigate fires and subsidence in Jharia Coalfields.
6. Timely implement solar energy projects.
7. Strengthen the Environmental Department in subsidiaries.
8. CIL must improve monitoring and supervision to ensure environmental compliance.

Best practices

The report highlights a collaborative and rigorous approach in conducting the audit, involving the management of CIL and the Ministry of Coal (MoC) at various stages. Interactions took place throughout the audit, such as at the beginning, to clarify the scope and objectives of the audit, and at the end, to share preliminary findings and recommendations.

The practice of submitting the draft report to the Ministry, incorporating relevant contributions, reflects a commitment to the accuracy and adequacy of the recommendations, contributing to a transparent and impactful audit.

Coal mine - India
Font: Adobe Stock

★ Key highlight

A relevant practice for other Supreme Audit Institutions (SAIs) was the use of a varied sample, encompassing different types of mines—underground, open-pit, mixed, and closed. This method allowed for a comprehensive and representative evaluation, increasing the applicability of the audit results and recommendations to the various operational conditions of the mining industry.

Indonesia - Performance Audit of Energy Transition

TITLE	Performance Audit of Energy Transition		
Author	Badan Pemeriksa Keuangan Republik Indonesia (BPK)		
Country	Indonesia	Publication	2022
Accessed on	https://www.bpk.go.id/ihps		
Highlighted energy transition topics present in the report	Governance	Yes	
	Just and inclusive energy transition	Yes	
	Finance	Yes	
	Covers more than one energy transition theme (Technologies)	No	
	Broad assessment of the energy transition	Yes	

Context

Indonesia has set a “net zero” emissions target for 2060, aiming to drastically reduce its greenhouse gas emissions and offset the remaining emissions through carbon capture technologies and environmental absorption. This goal requires a gradual transition from fossil fuels to renewable energy sources without compromising energy security and access.

To achieve this transition, the government has already taken several actions, such as:

- Development of a plan to reach net zero emissions by 2060.
- Market policies to ensure the supply of coal and natural gas to the domestic market.
- Preparation of an enhanced Nationally Determined Contribution (NDC) and a Long-Term Low Carbon and Climate Resilience Strategy until 2050.

This audit was conducted as an effort by the BPK to encourage the government to achieve the 7th SDG, particularly target 7.1 – to ensure universal access to affordable, reliable, and modern energy services.

Audit Scope

The audit aimed to evaluate:

- Activities of the Ministry of Energy and Mineral Resources, the Ministry of Environment and Forestry (KLHK), and other government agencies in managing coal, natural gas, and renewable energy.
- The security, equity, and sustainability of energy in specific regions such as DKI Jakarta, West Java, North Sumatra, among others.

Key issues addressed

The main issues addressed in the document[3] analyzed were:

1. What are the key risks that could prevent Indonesia from achieving its net zero emissions commitment by 2060?

2. Is the current electricity generation capacity and the ongoing expansion projects sufficient to prevent long-term energy supply deficits?

3. Are the available data in the electricity sector reliable enough to accurately quantify greenhouse gas emissions?

4. Is the 23% renewable energy target economically viable, considering production costs and the need for subsidies?

5. Is the coordination between government entities adequate to ensure effective implementation of the energy transition and continuous monitoring of GHG emissions?

Methodology and criteria used

To assess the Indonesian government's energy transition goals, the BPK created a five-year plan with sequential audits to support government improvements. This audit used:

- **Quantitative Methods**: Big data, analyses, and surveys, along with a predictive model of the current policy impact.
- **Qualitative Methods**: Document analysis, interviews, observations, and focus group discussions.

[3] The listed questions were formulated based on the findings and serve as suggestions aimed at clarifying and structuring the areas of investigation addressed by the audit, although the original report did not explicitly include them.

The audit also incorporated the assessment of the "energy trilemma" — security, equity, and sustainability — to examine the social and economic impacts of energy transition policies.

The criteria derive from regulations and international conventions on energy management, covering:

- Policy and strategy
- Financing and fiscal instruments
- Research and innovation
- Infrastructure development

Key documents include the enhanced NDC and the Long-Term Low Carbon and Climate Resilience Strategy (LTS-LCCR) 2050.

Key Findings

The audit identified critical issues that could significantly impact the government's efforts in managing primary energy for electricity, to ensure the availability, accessibility, and sustainability of energy, including:

1. Some scenarios indicate a risk of not reaching net zero by 2060.

2. Limited progress in expanding electricity capacity, with the risk of future shortages.

3. Projected deficits due to the slow implementation of new electricity generation projects.

4. Lack of reliable primary data in the electricity sector to reflect actual emissions.

5. The transition to renewable energy may increase electricity costs, negatively impacting vulnerable communities.

6. The 23% renewable target may raise the cost of electricity production and increase the government subsidy required.

Recomendações apresentadas

As recomendações mais relevantes foram:

1. Melhorar a coordenação governamental para um roteiro abrangente de transição energética e monitoramento da infraestrutura e emissões de GEE.

2. Implementar ações urgentes para acelerar projetos no período de 2021 a 2030, considerando medidas que minimizem o aumento dos custos de eletricidade para as populações de baixa renda.

3. Detalhar o roteiro para o setor energético com mitigação de riscos e análise de impacto das escolhas feitas, incluindo a avaliação dos efeitos sociais e econômicos das políticas propostas.

4. Consolidar dados entre diretorias para um inventário de GEE mais preciso no subsetor de eletricidade.

Best practices

The development of an impact forecasting model, including costs and subsidy effects, stands out as an innovative practice. The audit also applied mixed methods, combining quantitative analysis with qualitative insights, which strengthens the analysis of complex policies.

★ Key highlight

The audit comprehensively addressed the long-term risks of the energy transition, especially concerning electricity generation. This assessment included an analysis of economic, environmental, and social impacts, with a strategic view for the net zero scenario.

In addition to assessing the policies in place, the audit explored the structure and assumptions of these policies, considering the projected scenarios for the transition and the strategic roadmap developed for the sector.

Norway - Clean Energy Assistance

TITLE	Clean Energy Assistance *(Bistand til Ren Energi)*		
Author	Riksrevisjonen – Office of the Auditor General (OAG)		
Country	Norway	Publication	2014
Accessed on	https://www.stortinget.no/Global/pdf/Dokumentserien/2013-2014/dok3-201314-012.pdf		
Highlighted energy transition topics present in the report	Governance	Yes	
	Just and inclusive energy transition	Yes	
	Finance	Yes	
	Covers more than one energy transition theme (Technologies)	Yes	
	Broad assessment of the energy transition	Yes	

Context

Norway considers a focus on clean energy in developing countries a key part of its overall climate and energy policy. The Ministry of Foreign Affairs has been providing assistance for the development of the energy sector for several decades, maintaining stable goals. Africa is the priority area for this assistance, focusing on countries such as Ethiopia, Liberia, Mozambique, Nepal, Tanzania, Uganda, and Timor-Leste.

The initiative covers the use of renewable energy sources (hydropower, solar, and wind) and efficient stoves, aiming to reduce indoor air pollution and improve access to electricity in regions with unstable supply. A significant portion of the population in these countries lacks access to electricity, energy production is low, and energy supply is unstable.

Audit Scope

The audit aimed to assess to what extent Norwegian assistance for clean energy aligns with the Norwegian Parliament's (Storting) goal of increasing access to sustainable energy services, thus contributing to economic growth and better living conditions for the poorest.

The assistance was mainly directed toward the seven partner countries (Ethiopia, Liberia, Mozambique, Nepal, Tanzania, Uganda, and Timor-Leste), which received around NOK 3.9 billion in clean energy aid between 2000 and 2013.

Key issues addressed

The main issues addressed by the Riksrevisjonen in the analyzed document were:

1. To what extent has Norwegian aid contributed to increasing access to clean energy?
2. To what extent has this aid benefited the poor?
3. To what extent has the assistance contributed to a sustainable energy supply?
4. To what extent does the Ministry of Foreign Affairs ensure the fulfillment of clean energy aid goals?

Methodology and criteria used

The audit was conducted in accordance with Riksrevisjonen's guidelines, following performance audit standards based on ISSAI 300 and aligned with international INTOSAI standards.

To address the issues at hand, document analyses, interviews with stakeholders in Norway and Tanzania, focus group meetings, and statistical analyses were conducted. The research in Tanzania included two field visits, in addition to sending a list of questions to the embassies of the prioritized partner countries for energy assistance.

In total, 18 interviews were conducted, involving entities such as the Ministry of Foreign Affairs, the Norwegian Agency for Development Cooperation (Norad), the Ministry of Foreign Affairs' Regional Affairs and Development Department, the Norwegian Investment Fund for Developing Countries (Norfund), the Norwegian Energy System Operator (Statnett), and the Norwegian Water Resources and Energy Directorate (NVE).

The document analysis covered project documentation from selected partner countries, policy documents, and other internal records from the Ministry of Foreign Affairs. Furthermore, performance reports, evaluations from the Ministry, Norad, and Norfund, as well as relevant academic literature, were reviewed.

All embassies responded to the questionnaire sent, providing information on specific results from technical energy assistance, such as energy produced, number of new connections to the grid, and projects in collaboration with private sector actors, in addition to reporting their experiences in capacity-building projects. The embassies also provided assessments on the prioritization of the energy portfolio and management dialogue with the Ministry of Foreign Affairs.

Statistics on the size and distribution of Norwegian clean energy aid were extracted from Norad's Aid in Figures database, which compiles the information reported annually to the OECD Development Assistance Committee.

Several variables influence the impact of clean energy aid. To better understand this context, an in-depth analysis of the situation in Tanzania was conducted. This study provided insights into the economic and political conditions of the energy sector. Norway's energy portfolio in Tanzania includes various ministry initiatives, including energy generation and distribution projects, capacity-building, and local initiatives.

The challenges faced in the energy sector in developing countries are broadly represented in Tanzania, making the Ministry of Foreign Affairs' approach relevant to other partner countries.

Main findings

1. Norwegian aid had a limited impact on increasing access to clean energy.
2. The assistance barely benefited the poor.
3. Issues in the planning of capacity-building projects affected implementation.
4. The lack of a solid foundation for planning and decision-making within the Ministry of Foreign Affairs compromised the effectiveness of aid management.

Recommendations presented

Riksrevisjonen recommends that the Ministry of Foreign Affairs:

1. Assess how technological advancements in renewable energy can be leveraged to increase and stabilize energy production in recipient countries, aiming to reach the poorest more effectively.
2. Consider alternative instruments that can stimulate private investment in clean energy, especially in countries with fragile structural conditions.
3. Ensure that capacity-building planning takes into account the organizational challenges and capabilities of the receiving institutions.
4. Ensure that embassies conduct analyses that underpin the prioritization and decisions on clean energy aid, better tailoring instruments to the conditions of partner countries.

Best practices

The analysis of the Ministry of Foreign Affairs' efforts to encourage private investment was conducted through interviews with the Regional Affairs and Development Department and Norfund, as well as a focus group meeting with private investors in Tanzania. To address access to clean energy, project documents, national statistics were examined, and interviews were conducted with the Norwegian embassy, local partners, and other donors.

A focus group meeting with representatives of civil society in Tanzania was also held, focusing on the topic "Energy and Poverty," to gather relevant information. The review of specialized literature and reports on access to energy for vulnerable populations complemented this analysis.

Wind turbines - Norway
Font: Adobe Stock

★ Key highlight

To assess the socio-economic challenges related to the energy transition in Africa, Riksrevisjonen conducted an in-depth investigation in Tanzania, selected as a representative sample for the formulation of the audit's findings and recommendations. This analysis provided a broader understanding of the conditions affecting the implementation of Norway's Clean Energy Initiative policy, reflecting the ministry's various tools, including energy generation, distribution projects, and capacity-building.

The approach adopted by Riksrevisjonen offers a detailed methodological framework, with clearly defined audit criteria, including objectives, evaluation criteria, and evidence collected through interviews, field visits, focus groups, and document review. This methodological approach can serve as a valuable reference for other SAIs in their own audits and public policy evaluations.

Portugal - Audit Of The Recovery And Resilience Plan – Azores

TITLE	Audit of the Recovery and Resilience Plan – Azores	
Author	*Tribunal de Contas (Secção Regional dos Açores)*	
Publication	2023	
Accessed on	https://www.tcontas.pt/pt-pt/ProdutosTC/Relatorios/RelatoriosAuditoria/Documents/2023/rel003-2023-sratc.pdf	
Highlighted energy transition topics present in the report	Governance	Yes
	Just and inclusive transition	No
	Finance	Yes
	Covers more than one Thematic Area (Technologies)	No
	Broad assessment of the energy transition	No

Context

The audit was conducted as part of the 2023 audit program of the Regional Section of the Azores Court of Auditors, aligned with the 2023-2025 Strategic Three-Year Plan, focusing on strengthening control over reforms and investments funded by European financing, particularly those from the Recovery and Resilience Plan (PRR-Açores).

This plan allocated 580 million euros to the Autonomous Region of the Azores, under the supervision of the Regional Directorate of Planning and Structural Funds (DRPFE), with completion expected by 2026. With a budget of 116 million euros until 2025 for the Energy Transition in the Azores, the country aims to increase the share of renewable energy resources in electricity production, reduce greenhouse gas emissions, decrease energy dependency, and improve energy supply security.

Audit Scope

The audit's objectives were:

- To assess the results achieved by December 31, 2022.
- To identify factors influencing performance, including potential risks.
- To analyze compliance with the obligations established in the PRR-Açores governance model, as regulated by Regional Regulatory Decree No. 23/2021/A.
- To verify the actions of the Economic and Social Council of the Azores (CESA) as the monitoring body.

Key issues addressed

The main issues addressed by the audit were:

1. Are PRR-Açores investments being effectively implemented?

2. Is the Regional Directorate of Planning and Structural Funds (DRPFE) meeting the obligations set out in Regional Regulatory Decree No. 23/2021/A, of September 3?

Methodology and criteria used

The audit used methodologies established by the Court of Auditors, including the Audit Manual – Fundamental Principles and the Court of Auditors' Performance Audit Manual, with necessary adaptations due to the nature of the audit.

Data collection was carried out with the audited entity (DRPFE), the Economic and Social Council of the Azores (CESA), and the Regional Administrative Inspection of Transparency and Anti-Corruption (IARTCC).

Key Findings

The audit found that:

1. As of December 2022, a total of 57 (64.77%) of the 88 milestones and targets were completed, with a financial execution of 90 million euros (34.66% of the total planned).

2. Investment implementation suffered from inflationary pressure and raw material shortages in the global market.

3. The DRPFE's coordination and monitoring body met regulatory obligations, including implementing a management and internal control system with anti-fraud measures.

4. CESA fulfilled the planned actions but faced some challenges, which were largely overcome.

Recommendations presented

The main recommendations included:

1. DRPFE should adapt instruments from the Azores Operational Program 2020 to align them with PRR-Açores.

2. DRPFE reports should contain more detailed information to improve monitoring and transparency.

Best practices

The audit was carried out in three phases: 1) Planning; 2) Execution; 3) Report preparation. The Planning phase is highlighted, where the Court of Auditors, based on a preliminary study, developed a Global Audit Plan that sets out the object, scope, objectives, and audit issues. The Plan includes the method, criteria, techniques, and evidence collection sources, as well as the probable results of the audit.

★ Highlight

The highlight of this audit is the robust management and internal control system with anti-fraud measures implemented by DRPFE in collaboration with IARTCC. This system, adapted to the specifics of PRR-Açores, provides an interesting model for SAI working with European funds and other large-scale audits.

United Kingdom - Achieving Net Zero

TITLE	Achieving net zero		
Author	National Audit Office (NAO) – United Kingdom		
Publication	2020	Period of execution	April to September/2020
Accessed on	https://www.nao.org.uk/wp-content/uploads/2020/12/Achieving-net-zero.pdf		
Highlighted energy transition topics present in the report	Governance		Yes
	Just and inclusive transition		Yes
	Finance		Yes
	Covers more than one Thematic Area (Technologies)		Yes
	Broad assessment of the energy transition		Yes

Context

In June 2019, the UK government passed legislation committing to achieve "net zero" greenhouse gas emissions by 2050. This involves a substantial reduction in emissions compared to current levels, as well as the offsetting of remaining greenhouse gases through equivalent removals from the atmosphere, using either natural processes or carbon capture technologies. This goal was set in alignment with the commitments of the 2015 Paris Agreement. The UK had previously set a goal in 2008 to reduce emissions by 80% by 2050 compared to 1990 levels and achieved a 28% reduction between 2008 and 2018. To reach net zero, the government recognizes the need for comprehensive changes, including investments in renewable electricity and transformations in the transport, land use, and building heating sectors.

Audit Scope

The audit aimed to analyze:

1. The scale of the challenge in achieving the net zero emissions target and the roles and responsibilities within the government to achieve this target.

2. The coordination arrangements between the different government departments involved in reaching net zero.

3. The government's plans for achieving net zero and the risks that need to be managed.

Key issues addressed

The main questions addressed by the NAO in the document include:

1. How will the net zero target be achieved?
2. How does the government understand the scale of the net zero challenge, including the costs?
3. What are the governance arrangements for net zero within the government?
4. How does the government define the strategy for net zero, including prioritization, resources, and coordination?
5. How is the government collaborating with external bodies, including the private sector?
6. How is the government aligning its processes and emissions with the net zero target?
7. What measures are in place to monitor, learn from, and improve progress?

Methodology and criteria used

The assessment draws on the NAO's audit experience with large-scale, long-term projects faced by governments, identifying the key risks that need to be managed to achieve net zero targets and optimize cost-effectiveness. The NAO includes analysis of the government's current progress and its future ability to manage these risks. The focus is on highlighting strengths and areas for improvement in the government's approach, rather than evaluating the cost-effectiveness of specific aspects.

Independent conclusions were based on document reviews and interviews. Previous NAO reports on sustainability, spending reviews, and intergovernmental programs were considered to identify relevant risks. The documents reviewed included:

- Organizational charts and governance structures of departments such as BEIS, Defra, DfT, and MHCLG;
- Presentations for the Climate Action Cabinet committees and the Climate Change National Strategy Implementation Group;
- Meeting minutes and terms of reference related to greenhouse gas emissions;
- Policy options on net zero and carbon budgets[1];
- Guidelines on asset management and policy evaluation;
- Guidance from the 2020 Comprehensive Spending Review;
- Departmental plans for BEIS, Defra, DfT, and MHCLG for 2018-20;
- Documents on green recovery finance;
- Reports from the Climate Change Committee (CCC).

Semi-structured interviews with staff from BEIS, Cabinet Office, Defra, DfT, HM Treasury, and MHCLG sought to understand the roles of government, the coordination arrangements between departments, and how the government is aligning its processes and emissions with net zero targets. These interviews also helped identify relevant documentary evidence.

Main findings

1. There are risks to consider for net zero agreements to be effective:

2. Lack of clear definition of roles for public bodies outside central departments.

3. Need for actions across the public sector to reduce emissions.

4. To reach net zero by 2050, a clear strategy must be defined before COP26.

[4] The carbon budget is the maximum amount of greenhouse gas emissions (GHGs) that can be emitted in order to prevent global warming from exceeding a specific level.

5. Managing the interconnections between aspects of net zero and other government priorities is necessary.

6. Continuous monitoring by BEIS is required.

7. Lack of data collection on costs and benefits of net zero-related policies.

8. Disconnection between public support and understanding of the necessary changes in people's lives.

9. Progress has been made in BEIS's plans to engage the private sector, but risks remain.

Recommendations presented

1. Promoting collective accountability among departments to manage risks.

2. Defining clear roles for executing bodies and incorporating their perspectives into plans.

3. Using pilot initiatives to develop low-carbon technologies.

4. Identifying uncertainties in the net zero strategy and developing a plan to mitigate them.

5. Building a model that considers interdependencies between activities toward net zero.

6. Monitoring the progress of net zero emission policies with clear and consistent data.

7. Collecting information on government spending to achieve net zero.

8. Establishing a public engagement strategy to ensure ongoing support.

9. Monitoring private sector investment.

Best practices

The report aims to strengthen parliamentary and public scrutiny of government actions towards net zero. Given the complexity of this target, all government bodies, including departments, independent agencies, and executive bodies, have essential responsibilities. The NAO, based on past experiences, identified the key risks that the government must manage to achieve this target efficiently and effectively.

The document also highlights the importance of carefully considering the risks associated with intergovernmental agreements, such as the prioritization of net zero by each department and the need for appropriate skills across the public administration. Additionally, the audit presents its methodology clearly, allowing other SAIs to understand and apply the lessons learned in their own assessments.

★ Key highlight

The audit provided an estimate of the value of policies supporting the government's net zero goals through the analysis of policy documents, statements, and sectoral commitment records. While this analysis has limitations, it offers an overview of the government's commitments to net zero, even if it does not constitute an exact quantification of the investments needed to meet climate targets.

The NAO documents its methodology in an accessible way in the annexes of the report, outlining the audit's objectives, evaluation criteria, and evidence base obtained through interviews and document reviews. This approach not only identifies relevant risks but also shares valuable lessons that can be leveraged by other countries in their audit practices.

Republic of Mauritius - Implementation of Measures for Sustainable Solid Waste Management

TITLE	**Implementation of Measures for Sustainable Solid Waste Management**		
Author	National Audit Office (NAO) - Republic of Mauritius		
Publication	2023	Period of execution	2018-19 and 2021-22
Accessed on	https://nao.govmu.org/nao/wp-content/uploads/PerformanceAuditReport/2022-23/DrugReport_2023.pdf		
Highlighted energy transition topics present in the report	Governance		Yes
	Just and inclusive transition		Yes
	Finance		No
	Covers more than one Thematic Area (Technologies)		No
	Broad assessment of the energy transition		No

Context

Environmental statistics in Mauritius show a concerning increase in the volume of solid waste sent to landfills, with a 30% rise between 2012 and 2021, from 388,000 to 501,000 tons, and a projected 650,000 tons by 2030. The country faces growing challenges in waste management, with total costs rising from Rs 1.1 billion in 2012 to Rs 1.8 billion in 2021, resulting in an average cost of Rs 3,500 per ton for collection and final disposal.

The Solid Waste Management Division (SWMD), currently under the Ministry of Environment, took responsibility for waste management in 2014 after transitioning from the Ministry of Local Government and Outer Islands. Its mission is to protect public health and the environment, aligning with the government's commitment to UN Sustainable Development Goal (SDG) Target 12.5, which aims to reduce waste generation through prevention, recycling, and reuse practices.

To assess the progress and effectiveness of the policies and practices implemented, the National Audit Office of the Republic of Mauritius conducted a performance audit, covering the period from 2018-2019 to 2021-2022, and eventually extending to data from previous and subsequent periods. The resulting report provides key findings, root causes, and recommendations to improve the sustainable management of solid waste and reduce reliance on landfills.

Audit Scope

The audit aimed to examine:

- The key aspects of planning for the implementation of measures to ensure the effective management of solid waste in Mauritius.
- The institutional arrangements between the Solid Waste Management Division (SWMD) and the Ministry of Local Government and Outer Islands (MoLG), aiming to ensure the timely implementation of measures. The adequacy of existing laws, regulations, policies, and procedures for efficient solid waste management (Solid Waste Management Strategic Plans – SWM) was also analyzed.

The following were not included in the scope of the audit:

- Activities related to the collection and transportation of household waste to waste management facilities by Local Authorities (LAs), as well as the operation, maintenance, and management of hazardous waste.
- The impact of fiscal incentives provided by the Ministry of Finance, Economic Planning, and Development, through various budgets, aimed at local recyclers.

Key issues addressed

The main issues addressed by the audit were:

1. Does the Ministry have implementable policies, strategies, and action plans to ensure the effective management of solid waste and maximize diversion from landfills?

2. Are the legal framework and institutional arrangements adequate to ensure efficient solid waste management and maximize diversion from landfills?

Methodology and criteria used

The audit was conducted in accordance with the International Standards of Supreme Audit Institutions (ISSAIs). Various methodologies were applied to understand the audited area and obtain sufficient, relevant, and reliable evidence to support the findings and recommendations.

Quantitative and qualitative data were collected from files and documents available at the Ministry of Local Government (MoLG) and the Solid Waste Management Division (SWMD). This data collection included information on policies, processes, systems, procedures, and practices. Details of strategic plans, as well as relevant provisions of existing laws and regulations, were reviewed.

Interviews with key individuals, as listed in Appendix I, were conducted at operational, intermediate, and senior management levels to confirm the documentary information and obtain additional explanations when necessary.

The criteria used in the audit were drawn from the Local Government Act, the Environmental Protection Act, and relevant regulations, as well as strategic plans and publications from international organizations.

The criteria, findings, root causes, recommendations, and conclusions were presented to the SWMD to confirm their relevance, accuracy, and adequacy. The SWMD's responses to the report's content were incorporated into the document.

Key Findings

The audit found that:

1. The solid waste management strategic plans (SWM) for 2005-2010, 2011-2015, and 2021-2025 include measures to divert waste from landfills but contain significant flaws.

2. The approval process for Phase I of the new 2021-2025 Strategic Plan experienced a 31-month delay, resulting in a late start for Phase II.

3. The implementation of strategies in previous plans was unsatisfactory, with only one composting plant in operation between 2011 and 2017, and 90% of the actions proposed in the 2011-2015 Plan not completed.

4. The proposal for a Waste Management Act, planned in the 2005-2010 Strategic Plan, has not yet been enacted, and the promulgation of the Waste Management and Resource Recovery Act, passed in April 2023, remains pending.

5. The institutional framework for solid waste management shows weaknesses, as evidenced by delays in acquiring color-coded bins and establishing composting plants, reflecting a lack of proper oversight between the Solid Waste Management Division and the Ministry of Local Government and Outer Islands.

Recommendations presented

The most relevant recommendations were:

1. Ensure the approval of Strategic Plans by the Government within a reasonable timeframe, with a political decision from those responsible for the Ministry of Environment's accounting and the Solid Waste Management Division.

2. Establish a Project Oversight Committee within the Ministry of Environment and the Solid Waste Management Division to monitor project implementation and ensure corrective actions.

3. Consider hiring qualified experts by the Solid Waste Management Division to promote the implementation of projects that divert waste from landfills.

4. Ensure the swift promulgation of the Waste Management and Resource Recovery Act and finalize the relevant regulations by the Solid Waste Management Division.

5. Strengthen infrastructure planning and coordination with Local Authorities through the creation of a Joint Monitoring Committee co-chaired by the Ministries of Environment and Local Administration.

6. Conduct a feasibility study before starting new Compost Aggregation Centers, ensuring that it addresses accessibility, design, and roles of those involved.

7. Promote public awareness about Compost Aggregation Centers and source separation of waste to improve the management of construction and demolition waste.

Best practices

The audit was conducted in compliance with the ISSAIs, applying various methodologies to understand the audited area and obtain sufficient, relevant, and reliable evidence.

The diverse methodological approach enabled a comprehensive analysis of solid waste management processes, resulting in well-founded conclusions. The research involved analyzing documents, policies, and practices, as well as conducting interviews with key stakeholders, ensuring a complete understanding of the operations and challenges faced.

The National Audit Office of the Republic of Mauritius also engaged the Solid Waste Management Division in validating the criteria and findings, fostering constructive dialogue and increasing the credibility of the report.

★ Key highlight

One standout aspect of this audit, in comparison to other performance evaluations, is the emphasis on the integration between the Solid Waste Management Division and Local Authorities. The audit highlighted the importance of effective coordination between entities for the successful implementation of waste management policies.

The mapping of a Joint Monitoring Committee, co-chaired by the Ministries of Environment and Local Administration, can serve as an inspiration for approaches in audits dealing with interinstitutional governance.

Republic Of Mauritius - Moving Towards Renewable Energy – Solar Water Heater Grant Scheme

TITLE	**Moving Towards Renewable Energy - Solar Water Heater Grant Scheme**		
Author	National Audit Office (NAO) – Republic of Mauritius		
Publication	2017	Period of execution	Not informed
Accessed on	https://nao.govmu.org/nao/wp-content/uploads/PerformanceAuditReport/2015-16/MOVING-TOWARDS-RENEWABLE-ENERGY-SOLAR-WATER-HEATER-GRANT-SCHEME.pdf		
Highlighted energy transition topics present in the report	Governance		Yes
	Just and inclusive transition		Yes
	Finance		Yes
	Covers more than one Thematic Area (Technologies)		No
	Broad assessment of the energy transition		No

Context

The Long-Term Energy Strategy (LTES) 2009-2025 and its Action Plan were developed by the Ministry of Renewable Energy and Public Utilities (MREPU) of Mauritius in 2009. This planning aimed to promote renewable energy and reduce dependence on fossil fuels.

To encourage the use of solar water heaters, the government launched a Solar Water Heater Subsidy Program (SWHGS), facilitating the adoption of this technology by the population and aiming to achieve strategic energy sustainability goals.

Audit Scope

The audit aimed to evaluate the planning, implementation, and monitoring under the responsibility of the Ministry of Environment, Sustainable Development, Disaster Management, and Beaches (MESDDBM), focusing on the effectiveness of the program in achieving its objectives. The analysis covered the completed phase and an ongoing phase of the SWHGS, with a review of the issues identified in previous phases to determine if they were properly addressed in the subsequent stages.

Key issues addressed

The main issues addressed by the NAO of the Republic of Mauritius in the analyzed document were:

1. Was the program planning aligned with the objectives of the Long-Term Energy Strategy (LTES)?

2. Were the phases improved based on previous lessons to better achieve the goals?

3. Did the implementation follow the defined criteria and procedures?

4. Was post-implementation evaluated in terms of the benefits obtained?

Methodology and criteria used

The audit followed the International Standards of Supreme Audit Institutions (ISSAIs) and the Guidelines for Performance Auditing.

Techniques such as data collection, document analysis, interviews, and sampling were applied to understand the audited area and gather sufficient, relevant, and reliable evidence to support the conclusions and recommendations.

Interviews with key professionals from entities such as the Ministry of Energy and Public Utilities, the MESDDBM, the Mauritius Development Bank (DBM) Ltd, the Ministry of Finance and Economic Development, the Mauritius Standard Bureau, and the Consumer Protection Unit of the Ministry of Industry, Commerce, and Consumer Protection were highlighted to better understand the program's operation. Regarding sampling, a non-statistical sampling method was adopted to select registered suppliers from a list, representing approximately half of the distributed subsidies and equipment provided in the analyzed phases.

The criteria used to evaluate the Solar Water Heater Grant Scheme (SWHGS) program were obtained from the following sources:

- Regulations defined in accordance with the Finance and Audit Act, Energy Efficiency Act, and Consumer Protection Act.
- Strategic government documents, such as the Long-Term Energy Efficiency Strategy (LTES), the respective action plan, budget speeches for the analyzed period, and the Strategic Plan of the Maurice Ile Durable (MID) Fund.
- Contractual documents and memoranda of understanding (MoUs), including MoUs between the MESDDBM and DBM Ltd, contracts with suppliers, and agreements between suppliers and homeowners.

- Evaluations commissioned by the government to consultancies to create quality standards for solar water heaters and assess various phases of the solar heating program.
- Report by the World Energy Council, "Policy Measures to Support Solar Water Heating: Information, Incentives, and Regulations."

Main findings

1. The lack of a clearly responsible entity hindered the full implementation of the program.

2. Contracts did not clearly specify the scope of the warranty for solar water heaters, affecting consumers.

3. The lack of detail in the contracts prevented the Consumer Protection Unit (CPU) from addressing complaints effectively.

4. The absence of performance evaluation of suppliers during the warranty period resulted in long repair times and delayed responses to complaints.

Recommendations presented

1. Develop/implement a structure that is consistently responsible for the program, with clearly defined objectives and an appropriate mechanism to effectively implement each future phase. This structure will be responsible for planning, designing, and managing each phase. It will ensure benefits in terms of greater accountability, prioritized objectives, and capacity to implement and oversee future phases.
2. Designate a responsible entity for the program to ensure clear and consistent objectives.

3. Align the upcoming phases with the revised objectives of the LTES Action Plan.
4. Consider alternatives to direct subsidies, with additional incentives to promote solar water heaters.
5. Ensure expertise to resolve issues and improve the quality of installation and after-sales services.
6. Integrate supplier performance monitoring and a complaint resolution mechanism in each phase.
7. Establish an evaluation for each phase to improve future planning.
8. Measure the program's effectiveness and make necessary adjustments.
9. Prioritize homes with equipment that could generate greater savings by being replaced with solar water heaters.

Best practices

The audit highlighted the importance of establishing clear and robust criteria based on legislation, regulations, and strategic documents such as the Long-Term Energy Efficiency Strategy (LTES) Action Plan and the Strategic Plan of the Maurice Ile Durable (MID) Fund.

Collaboration with external consultancies and the use of specialized reports, such as the one from the World Energy Council, contributed to defining quality standards and evaluating the different phases of the program, fostering a more evidence-based and grounded process.

Continuous communication between the NAO and stakeholders during the audit process was essential to ensure that the conclusions and recommendations were relevant, accurate, and applicable.

★ Key highlight

The audit showed how the integration of technical and strategic criteria, combined with the use of specialized external assessments, can enrich the analysis and strengthen the governance of energy transition programs.

This method allowed the identification of significant gaps in the program, such as the lack of a responsible entity and inadequate mechanisms for monitoring and resolving complaints, leading to concrete recommendations for future improvements.

Czech Republic - Measures to improve the energy performance of residential buildings supported by the Integrated Regional Operational Programme and The New Green Savings Programme

TITLE	Measures to Improve the Energy Performance of Residential Buildings Supported by the Integrated Regional Operational Programme and the New Green Savings Programme		
Author	Nejvyšší kontrolní úřad (NKU)		
Country	Czech Republic	Publication	2021
Accessed on	https://www.nku.cz/assets/kon-zavery/K20019_en.pdf		
Highlighted energy transition topics present in the report	Governance	Yes	
	Just and inclusive energy transition	Yes	
	Finance	Yes	
	Covers more than one energy transition theme (Technologies)	No	
	Broad assessment of the energy transition	No	

Context

Measures to improve the energy performance of apartment buildings, such as insulation, window replacement, or heating generator replacement, are funded by the Ministry of Regional Development (MoRD) with resources from the European Union (EU) through the Integrated Regional Operational Program (IROP).

Additional funds, from the state budget, are distributed by the Ministry of the Environment (MoE) under the New Green Economy Program (NGS).

Both programs aim to provide energy savings in apartment buildings, aligning with the Czech Republic's commitments to the EU as outlined in the Europe 2020 Strategy[2].

Audit Scope

The NKU focused on the public calls from the IROP and the NGS Program, which support measures aimed at improving the energy efficiency of existing residential buildings.

The sample used in the audit included three calls from the IROP and two from the NGS Program, covering the period from 2015 to 2021.

[5] The Europe 2020 Strategy, announced in 2010, aimed to ensure that the European Union's (EU) economic recovery after the financial crisis was accompanied by a series of reforms designed to build solid foundations for growth and job creation in the EU by 2020. Among the five main goals to be achieved by 2020 was to reduce greenhouse gas emissions by at least 20%, increase the share of renewable energy to 20%, and improve energy efficiency by 20%.

Key issues addressed

The main issues addressed by the NKU in the analyzed document were:

1. How did the ministries establish the conditions for the distribution of subsidies?

2. How were the subsidies administered?

Methodology and criteria used

The NKU focused on evaluating the performance of entities such as the Ministry of Regional Development, the Ministry of the Environment, the Czech Republic Regional Development Centre, and the State Environmental Fund, in addition to examining 14 projects related to energy savings in the residential sector.

Audits were conducted to assess whether the projects selected in the public calls had the potential to achieve energy savings goals and whether they indeed contributed to those objectives. Compliance with project parameters by beneficiaries and the transparency in communicating the terms of support were also evaluated.

The efficiency of the funds was analyzed with a focus on monitoring and evaluating the results achieved. The NKU checked whether the projections of the National Energy Efficiency Action Plan (NEEAP) for new energy savings were met, and whether the subsidies offered per gigajoule (GJ)[3] of savings achieved were within the established standards.

The criteria used in the audit were based on the following sources:

[6] Gigajoule (GJ) is a unit of measurement for consumed energy. One gigajoule is equivalent to one billion joules.

- Directive 2012/27/EU of the European Parliament and Council on energy efficiency.
- The Europe 2020 Strategy, aiming for smart, sustainable, and inclusive growth.
- The Energy Efficiency Directive of the Europe 2020 Strategy.
- The Czech Republic State Energy Policy (Government Resolution No. 362, 2015).
- The Czech Republic National Energy Efficiency Action Plan (NEEAP) (2017).
- Directive 2010/31/EU on the energy performance of buildings.
- The Czech Housing Concept 2021+ (Ministry of Regional Development, March 2021).

The mandatory target for the Czech Republic, according to Article 7 of the Energy Efficiency Directive, was set at 51.1 petajoules (PJ[4] of new energy savings, totaling 204.4 PJ of cumulative savings by 2020.

Main findings

The key findings were:

1. The projected energy savings were not achieved in the IROP or NGS programs.

2. The total allocation of funds amounted to CZK 12.9 billion, but only about one-third had been granted by the end of 2020.

3. In the IROP, the planned savings of 3.1 PJ were only 1.3 PJ (41%). In the NGS, of 2.8 PJ planned, only 0.4 PJ was saved (13.5%).

4. Low interest from potential beneficiaries in receiving subsidies, particularly in the NGS, where the subsidy rate was considered insufficient.

[7] A petajoule (PJ) is a unit of energy consumption, equivalent to one million gigajoules (GJ).

5. The Ministry of Regional Development (MoRD) did not define clear rules on the eligibility of expenses and did not adequately assess the projects.

6. The project administration process was long and demanding, taking an average of 104 days for initiative approval.

7. The Ministry of the Environment (MoE) did not adequately monitor how beneficiaries selected suppliers.

Recommendations presented

The ministries should assess the feasibility of the energy savings targets set to ensure compliance with the Czech Republic's national objectives in relation to the Energy Efficiency Directive.

Best practices

The NKU audit emphasized the importance of clear and transparent criteria in the distribution of energy efficiency subsidies. For example, the lack of rules regarding temporal eligibility and the failure to prioritize projects with higher energy impact hindered the efficient allocation of resources. This detailed governance analysis provides a relevant example for other Supreme Audit Institutions (SAIs), highlighting the need for continuous monitoring and evaluation.

★ Key highlight

The use of strategic sampling to evaluate the impacts of subsidy programs was an innovative practice by the NKU.

This approach allowed the NKU to verify the effectiveness of the programs in representative samples, with a total value of audited funds amounting to CZK 46.4 million, distributed between IROP (CZK 20.9 million) and NGS (CZK 25.5 million).

This approach allowed the identification of gaps in implementation and the offering of evidence-based recommendations, directly contributing to improving governance and ensuring that public funds achieve energy savings objectives.

The methodology and criteria used by the NKU to evaluate the funds were based on European and national regulations.

Czech Republic - State budget funds provided for support of energy savings

TITLE	State Budget Funds Provided for Support of Energy Savings		
Author	Nejvyšší kontrolní úřad (NKU)		
Country	Czech Republic	Publication	2015
Accessed on	https://www.nku.cz/assets/kon-zavery/K15002_EN.pdf		
Highlighted energy transition topics present in the report	Governance	Yes	
	Just and inclusive energy transition	Yes	
	Finance	Yes	
	Covers more than one energy transition theme (Technologies)	No	
	Broad assessment of the energy transition	No	

Context

Energy savings refer to the reduction in consumption, measured before and after the implementation of energy efficiency improvements. The European Energy Efficiency Directive (2012/27/EU) aims for a 20% increase in energy efficiency by 2020 and sets conditions for further progress beyond this target. The Czech Republic has committed to achieving this goal within the framework of its energy and climate strategy.

The Ministry of Industry and Trade (MoIT) is the main public administration agency responsible for energy and it coordinates compliance with European energy efficiency standards in collaboration with the Ministry of the Environment (MoE) and the Ministry of Regional Development (MoRD).

Audit Scope

The audit aimed to examine the use of resources allocated to energy savings and evaluate the results against the defined targets, covering the period from 2012 to 2014 (with some earlier and later periods analyzed as relevant). The audited entities included ministries and beneficiaries such as municipalities and companies.

Key issues addressed

The main issues addressed by the audit were:

1. Were the established energy savings targets achieved?
2. Are the financial resources allocated aligned with the energy savings targets?

Methodology and criteria used

The methodology used included a detailed assesment of programs under the responsibility of various ministries. The audit covered programs such as:

- Operational Program Enterprise and Innovation (MoIT)
- Green Savings Program (MoE)
- Subsidized Housing Programs (MoRD)

A total of 19 projects that received subsidies amounting to 858 million Czech crowns during the audited period were analyzed.

Key Findings

The audit found that:

1. The Czech Republic set an annual energy savings target of 47.48 PJ by 2020. However, the savings achieved fell short of expectations.

2. Only two programs used the "Energy Consumption Reduction" indicator to monitor energy savings, limiting the overall evaluation.

3. Meeting energy savings targets in public buildings depends on additional resources that have not yet been secured.

4. Procurement process failures and the use of ineligible expenses were identified, though these had no significant impact on the projects' targets.

5. Technical and environmental issues compromised the achievement of energy efficiency indicators in some projects.

Recommendations presented

The most relevant recommendations were:

1. Achieve additional energy savings of 6.83 PJ per year.
2. Annually double savings from 2014 to 2020.
3. Ensure that all ministries use the "Energy Consumption Reduction" indicator.
4. Secure new funding sources for long-term targets.
5. Ensure grants cover only eligible and effective costs.

Best practices

A good practice identified is the use of standardized indicators, such as "Energy Consumption Reduction," to facilitate consistent monitoring of energy savings policies.

Additionally, monitoring subsidies ensures that these resources are tied to clear goals, increasing transparency and reducing inefficient allocations.

Other practices include risk analysis and continuous monitoring of energy projects for preventive adjustments and sustainability, as well as identifying complementary funding sources to ensure robust financial support for long-term targets.

★ Key highlight

The multisectoral approach in auditing energy efficiency policies involved various ministries and local entities — with specific responsibilities such as environment, regional development, and trade — providing a comprehensive view of the impact of policies and programs.

This coordination not only reveals the effectiveness of the policies but also helps identify overlaps and gaps in implementation, harboring a more integrated management aligned with national energy savings and sustainability objectives. Furthermore, it ensures more thorough and effective monitoring.

Czech Republic - Finances Earmarked for the Support of Energy Production from Renewable Energy Resources

TITLE	Finances Earmarked for the Support of Energy Production from Renewable Energy Resources		
Author	Nejvyšší kontrolní úřad (NKU)		
Country	Czech Republic	Publication	2014
Accessed on	https://www.nku.cz/assets/kon-zavery/k14006_en.pdf		
Highlighted energy transition topics present in the report	Governance	Yes	
	Just and inclusive energy transition	No	
	Finance	Yes	
	Covers more than one energy transition theme (Technologies)	Yes	
	Broad assessment of the energy transition	No	

Context

The audit was based on the targets established by European Union Directives 2001/77/EC and 2009/28/EC, which stipulate that by 2020, at least 13% of the Czech Republic's final energy consumption must come from renewable sources.

Economic support played a crucial role in the development of renewable energy in the Czech Republic through operational subsidies for electricity production, investment aid, and tax incentives. This support was made possible by electricity consumer contributions and European Union funding since 2011.

Audit Scope

O período auditado foi de 2011 a 2013, estendendo-se quando relevante. A auditoria envolveu diversos ministérios e órgãos de regulamentação e teve como foco três áreas principais:

- Operational support for electricity production and its economic consequences.
- Investment aid for the construction of renewable energy facilities.
- Tax incentives for renewable energy.

Key issues addressed

The main issues addressed by the NKU in the analyzed document were:

1. Why and how is renewable energy supported in the Czech Republic?
2. Were the established targets achieved economically?
3. What were the costs and challenges of meeting these targets?
4. Does the development align with national strategic concepts and policies?

Methodology and criteria used

The NKU relied on document analysis and projections of future costs, using the following documents as audit criteria:

- State Energy Concept of the Czech Republic
- National Renewable Energy Action Plan
- State Environmental Policy of the Czech Republic
- Biomass Action Plan for 2012–2020

Main findings

The audit found that:

1. The 13% target set by the EU seemed achievable.
2. Legislation hindered flexible adjustments, limiting annual tariff reductions.
3. Support for renewable electricity generation is projected to exceed one trillion Czech crowns by 2030, with costs increasing annually due to legal mandates, passed on to consumers and supplemented by state subsidies.
4. While suspended, support for existing plants will continue for 20 to 30 years.

Recommendations presented

The most revelant recommendations[8] were:

1. Allow periodic adjustments to feed-in tariffs to reflect market conditions and optimize costs.

[8] The following recommendations were not explicitly presented in the original NKU audit report but have been developed based on the key findings observed. They are indicative and aim to provide a perspective on actions that could be considered to strengthen the effectiveness of policies supporting renewable energy production in the Czech Republic.

2. Implement annual evaluations of the costs and financial impacts of renewable energy support.

3. Diversify funding sources to reduce dependence on subsidies paid by electricity consumers.

4. Prioritize incentives for renewable energy technologies with higher efficiency and lower costs.

5. Establish specific indicators to monitor the performance of renewable energy investments.

6. Align renewable energy support policies with long-term environmental objectives to avoid negative impacts.

Best practices

The legal and regulatory framework for renewable energy financial support in the Czech Republic is clearly organized and outlined in the audit report. This structured approach can serve as a model for SAIs seeking precise legislative references in their reports.

Objections to audit protocols raised by audited entities, such as the Ministry of Agriculture and the State Agricultural Intervention Fund, were effectively addressed by the audit team. The transparent and well-documented handling of objections enhances the credibility of the audit process and is a recommended practice for SAIs.

★ Key highlight

The NKU employed a combination of criteria drawn from national legislation, EU regulations, and strategic government documents to support its findings. Additionally, it adopted a robust methodology for projecting future costs, relying on data from the Energy Regulatory Office (ERO) and legally established adjustment indices.

The NKU estimated that the cost of renewable energy support could exceed one trillion Czech crowns by 2030, with most of the burden passed on to consumers. This financial impact projection provides a long-term perspective and can help other SAIs incorporate predictive cost analyses into similar audits, enabling greater transparency and financial planning.

Turkey - Assessment of the Preparation Process for Implementing the Sustainable Development Goals - SDGs

TITLE	Assessment of the Preparation Process for Implementing the Sustainable Development Goals - SDGs	
Author	Turkish Court of Accounts (TCA)	
Publication	2020	
Accessed on	https://www.intosai.org/fileadmin/downloads/focus_areas/SDG_atlas_reports/Turkey/Turkey_2020_E_prep_FuRep.pdf	
Highlighted energy transition topics present in the report	Governance	Yes
	Just and inclusive transition	Yes
	Finance	No
	Covers more than one Thematic Area (Technologies)	Yes
	Broad assessment of the energy transition	Yes

Context

With the experience gained from the post-Millennium Development Goals (MDGs), the UN General Assembly adopted, in 2015, Resolution 70/1, "Transforming our World: The 2030 Agenda for Sustainable Development," which sets out the Sustainable Development Goals (SDGs). The 2030 Agenda includes 17 goals and 169 targets to be achieved by 2030, signed by 196 member countries.

Although the UN resolution is non-binding, it urges all countries to mobilize efforts to achieve the established goals. The SDGs aim to build an inclusive, sustainable, and resilient future by integrating economic growth, social inclusion, and environmental protection, as well as promoting peace and fostering partnerships.

Following the adoption of the SDG agenda, the International Organization of Supreme Audit Institutions (INTOSAI) emphasized that Supreme Audit Institutions (SAIs) play a supportive and capacity-building role in national, regional, and global efforts to implement the SDGs, as well as in reviewing and monitoring their progress. Additionally, it presented models for approaches that SAIs should follow regarding their contributions to this process.

The first approach presented by INTOSAI is the assessment of countries' preparedness to implement the SDGs. Under this model, many countries conducted audits of the preparation process for the SDGs. This report covers the evaluations of the preparation process for the 2030 Agenda.

The Sustainable Development Goals (SDGs) are crucial for the energy transition for several reasons, as they drive an integrated change that goes beyond energy use, addressing social, economic, and environmental issues essential for the country's successful energy transition. Among the SDGs most relevant to the energy transition, the following can be highlighted:

- Promotion of Affordable and Clean Energy (SDG 7);
- Decent Work and Economic Growth (SDG 8);
- Reduced Inequality (SDG 10);
- Climate Action (SDG 13).

Audit Scope

The audit focused on the mechanisms and infrastructure established or planned for the implementation of the SDGs in Turkey, covering:

- National policies and strategies for the implementation of the SDGs.
- The current status of preparations and plans at the national level.
- The effectiveness of monitoring, analysis, and reporting processes for indicators.

Key issues addressed

The audit was based on the following questions:

1. Is the political framework adequately structured to ensure the implementation of the SDGs?

2. Are the processes for data collection, analysis, and reporting of results for monitoring the SDGs effective?

3. Is there an established system to evaluate and report on the implementation of the SDGs at the national level?

Methodology and criteria used

The audit of national policies and strategies for the implementation of the SDGs used a systems and issues-focused approach. Difficulties in implementation were identified along with proposed solutions, following the International Standards of Supreme Audit Institutions (ISSAIs) and national and international regulations.

The work focused on the Turkish Statistical Institute (TURKSTAT) and the Presidency's Strategy and Budget Office (OSBP), responsible for SDG coordination, including analyses of various public units selected by sampling. Consultations were

held with umbrella entities and NGOs, and local government initiatives were evaluated. Interviews, document analysis, and review of international sources and reports from other SAI bodies contributed to understanding best practices.

With that, adequate audit evidence was collected. Conclusions were based on comparing the evidence with established criteria, and the quality control processes were followed according to the Turkish Court of Accounts (TCA) Guidelines, culminating in the audit report.

Key Findings

The audit found that:

1. Turkey integrated the SDGs into national strategies, preparing the 2019-2023 Development Plan.

2. Participation in the preparation of the plan was encouraged, although the results fell short of expectations.

3. The current monitoring system is insufficient to track and assess the SDGs effectively.

4. There are significant differences between entities in terms of capacity and preparedness for SDG implementation.

5. Although various actions have been taken to raise awareness about the 2030 Agenda, a centralized communication plan is needed.

6. Most local government activities are related to the SDGs, but resource planning is required for new projects.

7. TURKSTAT has integrated global indicators into the national monitoring system, but many have not yet been produced.

8. There is a need for a high-level coordination mechanism to ensure the effective implementation and management of the SDGs.

Recommendations presented

The most relevant recommendations were:

1. Clearly link government plans, policies, and strategic documents to the SDGs.
2. Prioritize the SDGs when developing the plan, as implementing all SDGs within a five-year period is not a realistic approach.
3. Establish communication with high-level managers when assigning institutional responsibilities for the SDGs to entities.
4. Implement measures to monitor the implementation of the SDGs by updating the OSBP's monitoring system.
5. Create an entity responsible for guiding and assessing local governments' compliance with strategic plans and activities related to the Development Plan or SDGs.
6. Ensure the participation of development agencies and regional development administrations in the SDG implementation process.
7. Establish a budgeting system to monitor SDG-related expenditures.
8. Conduct awareness studies on the SDGs in an effective manner.
9. Start working based on the priorities defined in the 11th Development Plan.
10. Assess the need for additional national indicators based on the purposes specified in the Development Plan.
11. TURKSTAT should prioritize actions to increase the data production capacity of entities.
12. Both TURKSTAT and the entities responsible for indicator production should focus on capacity development to generate disaggregated data.

13. Complete the work on the planned web platform for publishing sustainable development indicators.

14. Establish a Coordination Council within OSBP, involving high-level staff from all relevant public entities.

15. Ensure the participation of development agencies operating at the regional level and regional development administrations by involving them in the SDG implementation process.

16. Create a budgeting system to monitor SDG-related expenditures.

17. Begin work to determine the need for additional national indicators, as specified in the Development Plan.

18. The creation of specific working groups for Sustainable Development Indicators (SDIs) will be beneficial for the effective implementation of SDG processes.

19. TURKSTAT needs to focus on actions aimed at increasing the data production capacity of entities.

20. The Coordination Council established within OSBP should ensure the participation of high-level representatives from all relevant public entities. This council should monitor the implementation of the 2030 Agenda, ensure policy coherence with the SDGs, and guide necessary actions to achieve SDG targets.

Best practices

The audit was conducted in compliance with ISSAIs (International Standards of Supreme Audit Institutions), developed by INTOSAI, and based on national and international regulations, including academic studies and best practices.

A key aspect was the use of specific guidelines, such as the "TCA Guidelines for Thematic Audits" and the "Guideline for Auditing Preparedness for Implementation of the SDGs," developed by the IDI and supported by the UN. The audit focused on the central agencies responsible for the SDGs, TURKSTAT and OSBP, ensuring that the methodology was adapted to both local and international realities.

Wind turbine - Turkey
Font: Adobe Stock

★ Key highlight

A differentiating factor that may be useful for other SAI bodies was the use of an extensive set of 26 additional questions, beyond the usual three central questions. These questions assessed the regulatory framework, data collection, analysis, and reporting processes to monitor the SDGs. This detailed approach allowed for a more robust evaluation of preparedness and monitoring capacity, offering a practical example of how to structure audits to achieve more complete and accurate results.

European Union - Gas Supply Security in the European Union

TITLE	Gas Supply Security in the European Union	
Author	European Court of Auditors (ECA)	
Publication	2024	
Accessed on	https://www.eca.europa.eu/ECAPublications/SR-2024-09/SR-2024-09_PT.pdf	
Highlighted energy transition topics present in the report	Governance	Yes
	Just and inclusive transition	No
	Finance	No
	Covers more than one Thematic Area (Technologies)	Yes
	Broad assessment of the energy transition	Yes

Context

International Energy Agency (IEA) defines energy security as the continuous availability of energy sources at an affordable price. Gas supply security is essential for the well-being of the European Union (EU), especially considering that more than 80% of its natural gas is imported. The conflict in Ukraine in 2021 led to a supply crisis, causing a rise in prices and having significant impacts on gas supply. The European Court of Auditors (ECA) examined the effectiveness of the EU's strategic framework and measures to ensure security, focusing on reducing dependence on a single gas source and the transition to climate neutrality by 2050.

Audit Scope

The audit examined the EU's strategic framework and response measures to the gas crisis, analyzing the actions of the European Commission, particularly the Directorate-General for Energy (DG Energy), and interviewing authorities from Germany, Italy, and Poland, which together account for 48% of the EU's gas consumption.

Key issues addressed

The main issues addressed by the audit were:

1. Has the EU established an effective framework to ensure gas supply security?

2. Has the EU achieved the objectives set out in its response measures to the supply crisis?

Methodology and criteria used

The ECA analyzed actions taken by the EU from 2014 – when Russia's annexation of Crimea led to the revision of the Gas Supply Security Regulation – to November 2023. The previous report from the Court on supply security was published in 2015.

The evidence regarding supply challenges was obtained from the following sources:

- Review of documents such as EU regulations, guidelines, and Commission communication reports, statistics, and assessments;
- Analysis of the communication reports from the 27 Member States, with a focus on regional risk assessments and the National Energy and Climate Plans (NECPs);
- Interviews with officials from the European Commission and authorities from Member States;
- Evaluation of the systems used to select projects of common interest (without auditing specific projects);
- Survey with representatives of Member States in the Gas Coordination Group, an advisory forum that coordinates supply security measures.

Key Findings

The audit found that:

1. National energy and climate plans lack detailed information about investment needs and funding sources, making it difficult to assess their feasibility in achieving the 2030 goals.

2. The audit concluded that the EU's framework has ensured gas supply, although it is uneven between Member States, and the objectives of the crisis response have not always been clearly achieved.

3. Some of the EU's long-term initiatives, such as promoting cooperation between Member States, significantly contributed to supply security during the crisis, but the current structure does not maximize its full potential.

4. Only recently has the EU started developing a specific framework to ensure that gas prices remain affordable in the context of supply security.

5. The impact of some measures taken in response to Russia's use of gas as a geopolitical tool is unclear, and the growing reliance on liquefied natural gas (LNG), as well as the need to decarbonize consumption, presents new challenges.

6. By the end of 2023, the EU succeeded in diversifying its gas sources and stabilized prices around 45 euros/MWh, double the pre-crisis level.

7. The audit identified failures in the communication of information required by Regulation (EU) 2017/1938, with 18 Member States failing to complete the communication of preventive and emergency plans in 2019, and two Member States not sending any information.

8. The European Commission assessed the 2019 communications as incomplete and recognized the need to reform and simplify the process, while many Member States also requested simplifications.

9. The EU's system for selecting priority gas infrastructure projects, known as "projects of common interest" (PCI), was considered complex by the audit.

10. The Court found that the effectiveness of these projects is not sufficiently clear, hindering the assessment of the execution rate and the added value of being considered a PCI.

11. The EU adopted several measures in response to the crisis, such as improvements in storage, demand reduction, and mechanisms to avoid price spikes. Some of these measures helped ensure supply security and adequate storage levels.

12. Other measures, such as the gas price cap and demand aggregation, have not yet fully demonstrated their impact.

Recommendations presented

Based on its findings, the ECA recommended:

1. Complete the development of the EU framework on gas price affordability.

2. Improve the process of communication of information about gas supply security by Member States and revise the regional cooperation structure.

3. Review the regional cooperation structure.

4. Increase transparency in the execution of projects of common interest (PCI).

Best practices

As part of its oversight activities, ECA conducted a comprehensive evaluation of the measures adopted by the European Union regarding gas supply security, covering the period from 2014 to 2023. The audit involved a detailed analysis of the European Commission's (DG Energy) actions and direct consultations with authorities from Germany, Italy, and Poland—countries that together consume nearly half of the EU's natural gas.

This integrated approach provided a deeper insight into the challenges and progress in energy security, as well as offering a robust and well-founded assessment of the EU's procurement strategies.

★ Key highlight

A unique and relevant aspect of this audit, which can serve as a reference for other SAIs, is the clear and detailed structure of the recommendations. The report not only outlines four major strategic recommendations but also establishes specific steps and timelines for the European Commission to implement each one.

This level of detail and continuous monitoring of progress makes this practice a valuable tool for strengthening the effectiveness of audits and ensuring public bodies are held accountable for implementing the recommended measures.

European Union - European Union Industrial Policy for Renewable Hydrogen

TITLE	European Union Industrial Policy for Renewable Hydrogen		
Author	European Court of Auditors (ECA))		
Country	European Union	Publication	2024
Accessed on	https://www.eca.europa.eu/ECAPublications/SR-2024-11/SR-2024-11_PT.pdf		
Highlighted energy transition topics present in the report	Governance	Yes	
	Just and inclusive transition	No	
	Finance	Yes	
	Covers more than one Thematic Area (Technologies)	No	
	Broad assessment of the energy transition	No	

Context

The European Union (EU) has committed to achieving climate neutrality by 2050, with the decarbonization of greenhouse gas-emitting sectors. The European Commission (EC) has identified renewable hydrogen as essential for the decarbonization of sectors that are difficult to electrify.

In 2020, the European Commission launched the EU Hydrogen Strategy, updated by the REPowerEU plan in 2022, setting production and import goals for hydrogen and creating an emerging market within the European Union.

Audit Scope

The report assesses the effectiveness of the Commission in creating conditions for the development of the renewable and low-carbon hydrogen market, focusing on EU policies (Hydrogen Strategy and REPowerEU).

The audit covered the period from July 2020 to the end of 2023, excluding aspects of research and regulation in the transport sector, and focusing on renewable hydrogen, characterized by minimal emissions, and low-carbon hydrogen, which reduces emissions by at least 70% compared to fossil fuels.

Key issues addressed

The main issues addressed by the European Court of Auditors (ECA) in the analyzed document were:

1. What commitments has the EU made to mitigate greenhouse gas emissions?

2. Is the EU making progress towards hydrogen goals?

3. Has the EU adopted legal acts to support the emerging hydrogen market?

4. Is there a comprehensive set of funding mechanisms for the development of the hydrogen value chain?

5. Has the European Commission effectively coordinated the creation of the market with Member States and the industry?

Methodology and criteria used

The ECA analyzed strategic documents, regulations, funding programs, strategies, and national plans from four Member States (Germany, Spain, the Netherlands, and Poland), selected for representing different levels of progress and roles in the hydrogen value chain.

The sample included seven projects in these countries, selected based on criteria such as size, funding, and the application of hydrogen in production and consumption. Data from sources such as the International Energy Agency and the European Commission on projects and funding were also analyzed.

Additionally, the audit included interviews with members of the European Commission, national ministries, and industry associations.

Main findings

The audit found that:

1. The hydrogen production and import goals are unrealistic. The EU is far from reaching these goals.
2. While the legal framework is nearly complete, its impact is still uncertain.
3. There are multiple funding sources, but they may be insufficient to expand the hydrogen market in the EU.
4. The EC needs to improve internal coordination, coordination with Member States, and coordination with the industrial sector.

Recommendations presented

The most relevant recommendations for the European Commission were:

1. Assess the current situation and decide on the strategic path forward toward decarbonization without altering the competitive situation of the EU's main industries, which could lead to further deindustrialization.

2. Establish a roadmap for the EU to monitor progress.

3. Obtain accurate data on national financing and assess the adequacy of EU financing mechanisms.

4. Monitor the licensing processes by Member States.

5. Define a clear support and coordination plan with the hydrogen sector.

Best practices

The ECA presented its audit methodology in a detailed and accessible manner, with a specific chapter outlining objectives, evaluation criteria, and sources of evidence. This record includes robust data, interviews with stakeholders, a review of strategic documents, and a sample of projects in selected Member States.

This approach not only strengthens the transparency of the process but also provides a clear model for structuring complex audits, especially in areas like energy transition.

★ Key highlight

To analyze topics related to the energy transition and decarbonization, the ECA adopts a series of reports addressing specific aspects of industrial policy. This strategy provides an in-depth and sequential view of critical topics and supports monitoring outcomes over time.

This method proves valuable for other Supreme Audit Institutions (SAIs), as it allows them to address large topics in a continuous and organized manner. For example, in addition to the current report on hydrogen, the ECA has already published analyses on energy storage technologies (2019) and batteries (2023), establishing a line of policy evaluation for decarbonization strategies.

European Union - European Union Climate and Energy Goals

TITLE	European Union Climate and Energy Goals	
Author	European Court of Auditors (ECA)	
Publication	2023	
Accessed on	https://www.eca.europa.eu/pt/search-publications#k=Metas%20da%20UE%20em%20mat%C3%A9ria%20de%20clima%20e%20energia#l=2070	
Highlighted energy transition topics present in the report	Governance	Yes
	Just and inclusive transition	No
	Finance	Yes
	Covers more than one Thematic Area (Technologies)	Yes
	Broad assessment of the energy transition	Yes

Context

Climate change represents a global challenge, significantly impacting the lives of citizens in the European Union (EU). In response, the EU has set increasingly ambitious goals, including reducing greenhouse gas emissions, increasing the use of renewable energy, and promoting energy efficiency for 2020 and 2030.

In 2022, the European Commission (the executive body of the EU) reported that the EU had met its three climate and energy goals for 2020. It is essential to assess whether this performance resulted from internal actions or external factors.

The European Court of Auditors (ECA) decided to carry out this audit to draw lessons from successful practices, helping the European Commission evaluate the National Energy and Climate Plans (NECPs) and support Member States in finalizing them. The ECA also formulated recommendations to contribute to the EU's goal of achieving climate neutrality by 2050.

Audit Scope

The audit aimed to:

- Evaluate the contribution of Member States to achieving the 2020 goal, examining whether the results were due to actions by the European Commission or external influences.
- Analyze the quantification of greenhouse gas emissions and the investment needs to meet the goals.

Key issues addressed

The main issues addressed by the audit were:

1. Were the 2020 goals met due to the EU's own climate actions?
2. How do the EU's results compare with those of other developed countries?
3. Has the EU learned lessons from its climate actions?
4. Will these lessons help achieve more ambitious goals by 2030?

Methodology and criteria used

The Court analyzed the work of the Commission and data from 1990 to 2021, primarily from Eurostat and the European Environment Agency.

Authorities from five Member States (Germany, Ireland, Italy, Poland, and Sweden), responsible for 48% of the EU's greenhouse gas emissions, were interviewed. The ECA used Eurostat's database, which compiles annual energy consumption information, to track progress on the energy efficiency goal for 2020.

This data-driven analysis allowed examination of:

1. The progress of the 28 Member States regarding national renewable energy targets;
2. The evolution of greenhouse gas emissions between 2005 and 2020;

3. The fulfillment of the national target regarding the renewable energy quota in six Member States;

4. Greenhouse gas emissions in the EU by sector from 1990 to 2019.

Key Findings

The audit found that:

1. The contribution of some Member States to the EU's energy and climate goals was below expectations, even though the EU as a whole met its 2020 goals.

2. External factors, such as the 2009 financial crisis and the COVID-19 pandemic, were not considered by the European Commission.

3. The EU's goals do not include emissions embedded in imported goods or those generated by international aviation and maritime transport.

4. There is a lack of data on the costs of meeting the targets for the EU budget, national budgets, and the private sector.

5. National energy and climate plans lack information on investment needs and sources of financing, making it difficult to assess their robustness in achieving the 2030 goals.

Recommendations presented

The most relevant recommendations were:

1. Increase transparency in the communication of climate and energy action performance by the EU and Member States.

2. Consider all greenhouse gas emissions caused by the EU, including those in trade and those from international aviation and maritime transport.

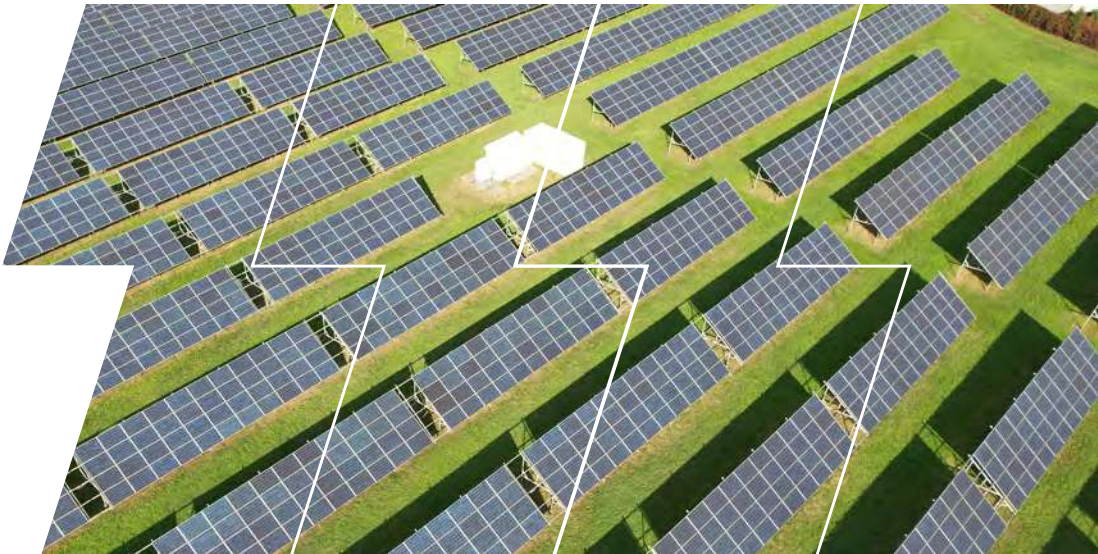
3. Support Member States in meeting their 2030 targets.

Best practices

The methodology was based on statistical data provided by Eurostat, the same data used by Member States when communicating with the European Commission.

This data-driven and official approach enhances the reliability of the audit's findings.

Solar power plant - Czech Republic, European Union
Font: Adobe Stock



★ Key highlight

The issues addressed in the audit are relevant and allow for investigating whether the results can be solely attributed to the European Commission's actions or if they are influenced by external factors.

Furthermore, the lessons learned from the climate actions of 2020 will be valuable in achieving the long-term goals of the European economic bloc, providing valuable guidance for other Supreme Audit Institutions (SAIs).

European Union - Support of the European Union for Sustainable Biofuels in Transport

TITLE	Support of the European Union for Sustainable Biofuels in Transport	
Author	European Court of Auditors (ECA)	
Publication	2023	
Accessed on	https://www.eca.europa.eu/ECAPublications/SR-2023-29/SR-2023-29_PT.pdf	
Highlighted energy transition topics present in the report	Governance	Yes
	Just and inclusive transition	No
	Finance	No
	Covers more than one Thematic Area (Technologies)	No
	Broad assessment of the energy transition	Yes

Context

Greenhouse gas emissions in the transport sector have increased significantly in recent decades. The integration of biofuels as an alternative to fossil fuels is a strategy of the European Union (EU) to reduce these emissions and improve energy security.

In 2021, about 93% of the energy used in EU road and rail transport came from fossil fuels.

Audit Scope

The audit assessed whether the EU effectively supports sustainable biofuels in transport and whether they contribute to meeting the EU's climate and energy goals. The competition between food production and fuel production, as well as issues of energy security and climate change, were considered particularly relevant.

Key issues addressed

The main issues addressed by the audit were:

1. What is the robustness of the strategic framework for biofuels?
2. Are the Commission and Member States addressing the challenges of sustainability, biomass availability, and costs?
3. What is the effectiveness of the EU's support for the implementation of biofuels?

Methodology and criteria used

1. Review of relevant data and documents, such as scientific, strategic, legislative, policy, and project documents.

2. Interviews with nine directorates-general of the Commission[9] and the European Environment Agency.

3. Interviews with national authorities and relevant stakeholders in selected Member States.

4. Analysis of 22 biofuel projects in selected Member States through document analysis and site visits.

5. A questionnaire sent to the 27 Member States in early 2023 with 13 questions on financing and national biofuel policy. The response rate was 100%.

6. A discussion panel with scientific experts from the policy and industry sectors.

Key Findings

The audit found that:

1. The EU's biofuel policy lacks stability, hindered by sustainability challenges and targets frequently unmet by Member States by 2020.

2. Frequent changes in legislation and priorities make it difficult to establish a long-term perspective for the sector, affecting investments.

[9] Agriculture and Rural Development; Climate Action; Energy; Eurostat; International Partnerships; Joint Research Centre; Mobility and Transport; Regional and Urban Policy; Research and Innovation.

3. New targets for 2030 have been set, including for the maritime and aviation sectors, but clear implementation roadmaps are lacking.

4. The future of biofuels in road transport is uncertain, especially with the proposed ban on new internal combustion vehicles from 2035.

5. Biomass availability is limited, competing with sectors such as food, cosmetics, and bioplastics, with no specific strategy to ensure sustainability.

6. Despite obligations imposed on fuel suppliers, fewer than half of Member States met the 2020 renewable energy targets in transport and emissions intensity reduction.

7. EU funding has supported advanced biofuels research, but their deployment faces barriers such as investment insecurity and high costs.

Recommendations presented

1. Develop a long-term strategic approach

- Develop a strategic roadmap for decarbonization post-2030, ensuring greater stability in biofuel policy, sustainable production protection, and support for the energy transition in transport sectors.
- In developing the post-2030 framework, consider the efficient use of biomass as the main source of sustainable biofuels, accounting for challenges such as availability, supply chains, sustainability, and usage priorities.

2. Improve guidance on the classification of advanced biofuels and assess raw material limits

- To avoid inconsistencies between Member States, improve guidance on the classification of raw materials for advanced biofuels, promoting fair competition conditions and greater security for the sector.
- In developing the post-2030 framework, assess the possibility and method of establishing maximum limits to address risks of fraud and raw material scarcity, regardless of technological level.

3. Improve data and transparency

- With the implementation of the EU biofuels database, improve the relevance of data used for policy design, monitoring, and evaluation (e.g., data collection on raw material and fuel origin).
- Resolve inconsistencies between biofuels datasets (Fuel Quality Directive, SHARES tool, and the new EU database) to improve data quality for users.
- Increase transparency regarding the impact of the multipliers used in calculating the energy content of fuels in the information reported on targets.

Best practices

The audit used extensive document analysis and involved external experts such as scientists and representatives of government organizations and specialized agencies, in addition to conducting a representative sample analysis of projects in various member countries. A representative sample analysis of projects in various Member States allowed for a detailed and comparable evaluation of the practices adopted and the results achieved.

★ Key highlight

The audit took a holistic approach to analyzing biofuels, addressing issues of competition with other industries such as food and cosmetics.

This comprehensive view enabled the identification of risks and interdependencies that affect the sustainability of biofuels, providing insights that cyan guide the work of other Supreme Audit Institutions (SAIs) in promoting a sustainable energy transition.

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