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Addressing "Wicked Problems" through Governance for Sustainable Development—A Comparative Analysis of National Mineral Policy Approaches in the European Union

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Abstract: The achievement of sustainable development (SD) in the supply of minerals poses significant challenges for governments and public administrations on all levels, because ensuring a sustainable supply constitutes a "wicked" problem that has no clear set of alternative solutions due to its social, institutional and scientific complexities. This paper explores how this problem is addressed through "governance for SD" principles (horizontal policy integration and participation; long-term vision/short-term action; and reflexivity and learning) in the design and delivery of national mineral policy strategies (NMS) in five EU Member States (Austria, Finland, Greece, Portugal and Sweden). Following a grounded theory approach on data collected through document analysis and complementary qualitative interviews, the author identified several analytical categories for the selected governance for SD' principles. Although no "one-size-fits-all" recipe for best practice on governance for SD exists in the five NMS, Finland, Portugal and Sweden meet high standards: These NMS display practical examples of governance for SD integration and, thus, lay the foundations for achieving policy outcomes in the sectoral policy strategies of the mineral supply.

Keywords: sustainable development; governance; mineral policy; policy strategy; wicked problems

1. Introduction

Europe's socio-economic development strongly depends on the secure and sustainable supply of minerals, such as Neodymium and Cobalt. In the past few years, among 41 economically important minerals and metals, the number of critical ones classified by the European Commission increased from 14 to 20 [1,2]. In the EU, at least 30 million jobs rely on the availability of raw materials, in general, as well as delivering new and innovative products [3]. As such, several European Member States established more strategic policy approaches (e.g., integrated strategies and action plans) to secure supply by facilitating primary mineral production. However, barriers to effective policies include the need to ensure public acceptance of mining operations, coherence with other policy areas, and business investment in order to manage primary production sustainably [4,5]. To effectively deal with these complex dynamics, the governance of mineral policy needs to address certain underlying factors.

As outlined by Bringezu et al. [6], the academic debate in the field of resource governance focuses mostly on the effectiveness of single policy instruments in local or regional settings (e.g., permitting procedures [7]), one of the facets of the complex dynamics of the mineral supply (e.g., public acceptance [8]), or the overall mineral policy framework [9,10]. However, less emphasis has been placed on the underlying factors of the policy governance framework for managing the complex dynamics of primary mineral production. To date, only a few limited regional studies covering the mineral policy governance framework, all of which were outside of the EU, have been published (e.g., Australia: McAllister et al. [11]; Canada: Everingham et al. [4]).

Governing the secure and sustainable supply of minerals from primary production faces particularly complex, "wicked" dynamics [4] (pp. 596–598). Numerous authors, who address this debate (e.g., Moffat and Zhang [12]), refer to one or several of its three key dynamics as outlined by Head and Alford [13] (p. 6). At the same time, the European Commission and individual EU Member States' mineral policy strategies (henceforth referred to as National Mineral Strategies (NMS)) call for the application of sustainable development (SD) in tackling this "wicked problem" [14] (p. 12) [15] (p. 4). The concept of a "wicked problem" approach applies to sustainable minerals supply due to its inherent relation to poly-rationality of stakeholders and institutional complexity (e.g., mining policy as a cross-cutting policy area). Thus, it acts as a baseline for the argumentation of an analytical framework based on governance for sustainable development. Therefore, the author argues that "governance for SD" not only accounts for the steering requirement of "wicked problems" [16–18] but, more importantly, is a necessary pre-condition for achieving sustainable development in these sectoral policy strategies. Consequently, this paper investigates how governance for SD principles, like horizontal policy integration, participation, long-term vision and short-term action, and reflexivity and learning, are incorporated into the design and delivery of NMS in five EU Member States (Austria, Finland, Greece, Portugal, and Sweden).

In Section 2 the paper briefly explains the importance of a sustainable mineral supply in Europe and then explores the particular complexities of this issue by utilizing the concept of "wicked problems" and its governance approaches. Sections 3 and 4 outline the rationale of the analytic framework for governance for SD principles, while Section 5 clarifies the methodological approach. Through the analysis in Section 6, the author investigates the dynamics of governing a "wicked problem" and identifies best practice examples in the context of mineral supply in NMS. Although no "one-size-fits-all" recipe for a best practice case exists in the five NMS, the results indicate that Finland, Portugal and Sweden meet high standards with regard to governance for SD. Essentially, these NMS display practical examples for the integration of governance for SD in sectoral concerns, having established both high political relevance and having contested social and environmental challenges. The paper concludes by indicating the relevance of governance for SD for both mineral policy and SD decision makers, as well as strategy development in general.

2. EU Policy Challenges and Responses to the Sustainable Mineral Supply

Sustainable mineral policy is a particularly salient issue, since an economy's functioning and society's well-being depend on a secure and sustainable supply of mineral raw materials. However, the projected world population growth, associated with a dramatic rise in the demand for raw materials, raises concerns for their supply [19–21]. Additionally, increasing per capita material consumption does not only put a strain on resource availability, but also causes negative externalities through waste and emissions that, in the long-run, will result in environmental damage by surpassing planetary boundaries [22,23]. This calls for policies that promote sustainable development, specifically in the area of extraction, efficient use, and recycling of raw materials.

The secure and sustainable supply of raw materials is a particularly relevant issue in the European Union (EU), due to Europe's strong import dependency [22,24]. Several factors such as commodity market distortions [25], competition on different land use types (e.g., mining versus agriculture), raw material demand for development, and rapid diffusion of key enabling technologies, might further endanger supply for Europe [26,27]. Consequently, in 2008, the European Commission (EC) established the Raw Materials Initiative (RMI) to better manage and coordinate responses to non-energy and non-agricultural raw material supply through a three-pillar approach [1,25].

From the RMI's three pillars, the second pillar addresses the domestic raw materials production sector. However, regulatory aspects fall under the competences of the individual EU MS. Facilitated by the EC expert working group recommendations [28], the RMI recommended the design of NMS, but it was not obligatory to adopt such strategies at the national level. In total, 10 EU Member States have designed a NMS to better accommodate the EU mineral policy framework objectives within their

particular raw material needs and the specific circumstances of their national economies [25]. Thus far, EU Member States of Austria, Finland, France, Germany, Greece, the Netherlands, Portugal, Sweden, and the United Kingdom have developed their own mineral strategies in the field of non-energy and non-agricultural raw materials. According to Rayner and Howlett [29] (p. 100), these NMS represent so-called "integrated strategies" "to address the perceived shortcomings of previous, more ad hoc, policy regimes". NMS share a streamlined policy instrument mix and the coordination of multiple goals, "so that multiple instruments support rather than undermine one other in the pursuit of those goals" [29] (p. 101). In the context of mining, Otto [30] (p. 2) first describes these strategies as a "stand-alone document" that provides guidance to public institutions and stakeholders " ... on the direction and expectation of the nation with regard to regulating the sector". What kinds of governance requirements are necessary to promote NMS' common objective of sustainable and secure mineral supply is an issue that will be investigated further in this paper.

3. "Wicked Problems" and Their "Clumsy" Solutions

The complex dynamics we encounter when attempting to realize SD or the sustainable mineral supply are issues that can best be conceptualized as "wicked problems" [31]. "Wicked problems" share aspects, such as contradictory certitudes (worldviews), that make them particularly challenging [32,33]. Environmental problems and SD issues are particularly "wicked", due to their inherent complexity and multitude of interactions of factors and different stakeholders, as well as the political and organisational inability to address endemic uncertainty and fragmentation in political and institutional terms [34] (pp. 141–145). Head and Alford [13] (p. 6) condense the problematic nature of "wicked problems" into three key dynamics (see also Figure 1): social pluralism, institutional complexity and scientific uncertainty. Managing the supply of minerals sustainably displays "wicked problem" dynamics, as outlined by, for example, Everingham et al. [4] (pp. 596–598).

Wicked problem characteristics		**Solution approach**	
Key dynamics (adapted from Head and Alford, 2013:6)	Detailed description	Addressed through clumsy solution approach	Addressed through Governance for SD principles
1. Social pluralism	- Problems involve a diverse range of stakeholders with different interests - Conflict between different interests and stakeholders is endemic due to poly-rationality - Stakeholder have different capacities to exert political influence	- This calls for 'clumsy decision making' that incorporates the plurality of problem formulations/framing and possible solution in a positive and productive way	Participation: stakeholder engagement, enabling capacity exchange = pluralistic and creative
2. Institutional complexity	- Problem required coordination at different level of governance (EU, National, Sub-national) - At national level sectoral organization of government has to be overcome through inter-organisational cooperation - Long-term thinking can be undermined by short political mandates and bargaining	- Need for collaboration between different political organizations and departments -This calls for a more adaptive/ collaborative leadership and broader thinking	Integration principle: horizontal and vertical integration Long-term visioning and short-term action = potential for synergies and coherence
3. Scientific uncertainty	- SD dimensions are complex and contested - There is no clear evidence of best practice - Information required to make policy decisions is fragmented and there are gaps of reliable knowledge	- Process needs to be adaptive and able to respond to new scientific and social developments - System needed to continuously test progress and underlying assumptions - Policy approach needs to incorporate different types of knowledge through the participation of different stakeholders	Reflexivity: evaluation and monitoring, policy leaning = adaptive

Figure 1. Governance for SD as a "clumsy" solution approach to "wicked problems".

Considering the dynamics of the sustainable mineral supply as a "wicked problem", one has to overcome the preliminary pessimism of Rittel and Webber [31] and approach this as a policy problem in a pragmatic manner. Rather than through simplification, "wicked problems" have to be addressed

through a process that considers the dynamics of social issues, as well as technical/scientific aspects and, thus, recognizes the "essential contestation" of the solution and the definition of the problem itself [35] (p. 18). Instead of attempting to find one clear solution dictated by technical rationality, "wicked problems" have to be addressed through an adaptive, collaborative and creative process. Verweij et al. [36] (p. 818) coined this as finding "clumsy solutions" that are "creative and flexible combinations of various ways of organizing, perceiving and justifying social relations" and attempting to adequately reflect the poly-rationality of stakeholders [37] (p. 249). "Clumsy" decision-making, thus, is a process that is participatory (addressing endemic conflict), iterative (ensuring quality of communication), and emerging (taking into account the uniqueness of the problem and plural policy responses) [36] (p. 838).

Respectively, several authors elaborated different "clumsy" solution approaches to consider the governance of "wicked problems". For example, Voß et al. [38] explored SD as a governance problem with three dimensions that are closely related to the key dynamics of "wicked problems". Others indicated how "clumsy" methods could inform public policy-making and governance approaches, in general (e.g., Head and Alford [13]), and sustainable resource management, in particular (e.g., [39–41]). However, what all these approaches have in common is the application of a set of guiding principles for governance processes instead of technical/rational thinking or management by strict rules. Similarly, Meuleman and Niestroy [42] suggested a concept of governance for SD, "Common But Differentiated Governance", which draws upon several general principles as a meta-governance approach for implementing the Global Sustainable Development Goals. Nevertheless, it remains a challenge to incorporate the exploratory and pluralistic ethos of "clumsy" solution approaches into policy-making in a meaningful way that works within, and modifies, existing institutional configurations. Thus, a framework that would enable us to compare and evaluate how governance approaches address "wicked" SD issues could be of immense utility. This paper attempts such an approach through an analysis of NMS as the governance instrument to address a "wicked problem", namely the sustainable and secure supply of minerals on the national level.

4. Governance for SD Principles as a Clumsy Solution Approach for Sustainable Minerals Supply

SD is conceptualised as a reflexive process that is facilitated/steered by the normative "governance for sustainable development principles" [42–45]. Governance for SD, in light of a "wicked problem", has to be conceptualised as "steering requirements" that facilitate a continuously emerging policy approach rather than the management/steering/guiding of the implementation of a particular policy [16–18,46–49]. These "steering requirements" are conceptualised in this paper through governance for SD principles that facilitate SD as a "clumsy" solution approach. The following governance for SD principles are a selection of particularly relevant aspects of our analysis of NMS: horizontal and vertical policy integration, participation, long-term visioning and short-term action and reflexivity and learning. Table 1 provides a synopsis of these principles to better put them into context with the "clumsy" solution approach (outlined in Figure 1).

Governance for SD principles could, therefore, act as a facilitating concept that translates the "clumsy" approaches that "wicked problems" call for into components that can be better integrated into the traditional policy cycle. More specifically, they constitute a path to address "wicked problems" within the policy cycle in a slightly more "clumsy" way, while putting additional emphasis on organizational problems, such as cross- and inter-ministerial cooperation and learning. Figure 1 illustrates this relationship between the three "wicked problem" key dynamics, the respective "clumsy" solution approach, and related governance for SD principles as a concrete example thereof.

Table 1. Governance for SD principles selected for this paper.

Governance for SD Principle	Short Description
Integration principle	Policy integration (horizontal) balances economic, social and environmental interests and policies in a way that trade-offs (or negative effects) between them are accounted for or minimised, and synergies (or win-win-win opportunities) are maximised within political institutions [50,51].
	Policy integration takes place among multiple levels, or hierarchies, across political-administrative levels (vertical), as well as territorially (i.e., from European to national, down to sub-national political-administrative levels).
Participation	Inclusion of non-governmental stakeholders in public policy-making can have ethical, political (public legitimacy) and knowledge reasons [52]. Quantity versus quality of participation needs to be considered.
Long-term visioning and short-term action	Generational impacts and nature of societal transition processes call for the consideration of longer time spans.
	A process of elaborated planning is needed to translate these long-term oriented visions into practical implementation in the more immediate future. This constitutes a major challenge due to the ambiguity of long-term goals and uncertainty about knowledge and systems development [38,45]. Meadowcroft [45] argued that this could be addressed by developing longer term operational objectives and breaking these down into intermediate ones and measurable targets.
Reflexivity and learning	Unknown dynamics of large scale system transformations, such as the transition towards a sustainable extractive sector call for reflexive processes aimed at "reconsidering existing practices, critically appraising current institutions and exploring alternative futures" [17].
	Central to this process is the establishment of effective monitoring and evaluation systems and subsequent "continuous adaptive learning" [53]. Young [54] summarises this approach as a separate governance strategy through the process of goal setting that serves to galvanize the efforts of participants within a specific timeframe and with the benefit of an operational metric for measuring progress.

In the following paragraphs, the paper outlines briefly why the integration of governance for SD principles into NMS is relevant in addressing "wicked problems", such as the secure and sustainable mineral supply:

Firstly, governance for SD plays a key role, because SD is an intrinsic part of NMS. Essentially, SD serves as the normative "meta-objective for policy" [45] (p. 307) that is given substance or concretised in the specific context of mineral policy. On the EU level, the European Commission calls for "defining a National Minerals Policy to ensure that mineral resources are exploited in an economically viable way, harmonised with other national policies, based on SD principles (. . .)" [14] (p. 12). Several EU Member States' NMS make an explicit claim towards the inclusion of sustainable development: References to SD are made in the overall objectives and specific action areas of NMS. For example, Sweden's Minerals Strategy [15] (p. 4) highlights that "Sweden's mineral assets are to be exploited in a long-term sustainable way, with consideration shown for ecological, social and cultural dimensions". Following this proposition for SD in NMS, the author argues that governance for SD principles are the fundamental basis for applying effective national mineral policy.

Secondly, governance for SD addresses steering limitations when facing the "wicked problem" of SD [16–18,43,48] or the sustainable and secure mineral supply. These limitations, inter alia, comprise a lack of necessary authority or means to tackle societal challenges, as well as adequate general or collective interest and legitimacy. Governance for SD addresses these limitations by facilitating societal co- or self-steering through communication and collaboration between multiple societal actors. Participatory or multi-stakeholder involvement principles support governments through a deliberative process of collecting and generating knowledge to successfully address societal challenges [45] and guarantee greater commitment, follow up implementation, and acceptance for

state-designed intervention [55]. This is particularly important in the context of the multi-dimensional and multi-stakeholder challenges inherent in the sustainable mineral supply through NMS [11,56–64]: Issues concerning the social licence to operate (e.g., Prno and Slocombe [64]), mining impacts on ecosystems (e.g., Bridge [56]), long-term business investment decisions for exploration and extraction, etc., all involve a large number of diverse stakeholders that are directly or indirectly impacted or involved. These factors are crucial to facilitate legitimacy of policy options and steering in this multi-stakeholder and multi-issue setting of mineral supply. Consequently, as argued by McAllister et al. [11] (p. 91), such a (governance for SD) approach "offers an important viable alternative to current policy efforts", in particular, in the case of the "mineral sector where sustainability is a secondary consideration, often added on to existing processes".

To give some indication of how "wicked problems" are being addressed in the case of the mineral supply, this paper focuses on the following research questions:

(1) Are governance for SD principles an intrinsic part of NMS?
(2) To what extent do different ministries collaborate, and what are the processes and mechanisms that define their involvement?
(3) To what extent do NMS integrate non-governmental actors in design and implementation?
(4) How comprehensive and elaborated is the translation of long-term planning into individual actions?
(5) To what degree do NMS include policy assessment tools?

5. Methods

To explore the role governance for SD principles play in the design, implementation and revision phases of five NMS, the author chose the following approach:

- A Multiple single-outcome study [65] (pp. 710–713) that focuses on investigating within-case (different governance for SD features within NMS) and across-case evidence (comparisons of 5 NMS). This, ultimately, gives insights on the multiple (range of phenomena i.e., features characterising governance for SD) single outcome (governance for SD).
- Small-N qualitative comparisons that take into account the complexity of underlying dynamics and complex configurations of factors within a particular context [66] (p. 301).

The abovementioned approach informs our sampling, data collection, analysis and analytical framework, which are explained in the following paragraphs.

Based on Seawright and Gerring [67] (pp. 294–295), the author intentionally chose purposive sampling instead of a random sampling, due to the small number of cases (i.e., a total of 10 EU MS developed a NMS). Since research design (i.e., small-N qualitative comparative multiple single-outcome study) and case selection are invariably connected, the author chose the "diverse case method", which primarily tries to achieve maximum variance along relevant dimensions. Sample stratification covered criteria, such as: (i) geological characteristics and diversity of mineral deposits; (ii) political systems; (iii) strategy development drivers; and (iv) geographical regions. The five NMS selected for the analysis are: FI: "Finland's Minerals Strategy" (adopted in 2010); AT: "Austrian Mineral Resources Plan" (2010); SE: "Sweden's Minerals Strategy" (2012); GR: "National Policy for the Exploitation of Mineral Resources" (2012); PT: "National Strategy for Geological Resources—Mineral Resources" (2012).

Case data collection and analysis used a mixed-method approach: Firstly, the authors conducted a document analysis of NMS documents to determine the extent to which these documents and corresponding governance processes coincided with governance for SD principles. In general, NMS vary greatly in their scope and size (e.g., EU MS have different focus areas). However, these NMS represent integrated strategies, and have in common a generic structure (see Rayner and Howlett [29]) and are subject to specific processes and mechanisms during their design, implementation and revision phase. Hence, the NMS' different focus areas do not impact the comparability on the governance level.

In a second step, document analysis was complemented by qualitative interviews with five policymakers from the respective national government ministries of the five selected countries responsible for the design and implementation of the NMS. The Author interviewed policy makers from the following ministries (see also Appendix A): Federal Ministry of Science, Research and Economy (AT); Ministry of Employment and the Economy (FI); Ministry of Environment, Energy and Climate Change (GR); Ministry of Enterprise, Energy and Communications (SE); General Directorate of Natural Resources, Security and Maritime Services (PT). The author selected these policymakers due to their responsibility for, and in-depth knowledge about, the governance processes, and designed a semi-structured questionnaire with qualitative open-ended questions. This questionnaire guided the flow of the interview, which lasted between 45 and 90 min. The author conducted five initial interviews with policymakers during the period from May to July 2014 and, in a later stage, complemented them by a second round of interviews with the same policymakers from April to June 2015 to further refine conceptual categories.

To increase validity and comparability of analysis results, both methods, document analysis and interviews, were conducted by the same researcher. However, the interviews only include the views of public administrators and, thus, exclude any views and expertise by other stakeholder groups affected by mineral policy-making.

The Author applied qualitative data-analysis techniques in Grounded Theory to allow the structure of the findings to emerge from the data: In the first order analysis (a process similar to open coding according to Strauss and Corbin [68], and recently discussed by Gioia et al. [69]) the author tried to distil as many categories as the data collection (i.e., document analysis and first round of interviews) allowed for. In the subsequent analysis, the author thought out similarities and differences among these categories (axial coding) in order to come up with a more manageable number of categories. This process has been followed by a second round of interviews which has been informed by more detailed questions based on the first order identified categories. Consequently this step of data collection and refinement led to the second order analysis which enabled the author to aggregate identified categories into emerging concepts (i.e., key features) that were complementing or expand existing literature. Following the above mentioned grounded-theory approach and respective analysis techniques (for applied research methodology, see also [70–73]), and drawing on insights from governance for SD literature [16–18], the author identified several categories and their respective dimensions within the above-mentioned key features.

By investigating the inclusion of governance for SD principles in NMS, the authors identified the following features through iterative comparative procedures of data collection, analysis and coding:

- Key feature 1: Inclusive actor strategy (related to principles: horizontal policy integration and participation);
- Key feature 2: Strategic follow-up implementation (related to principle: long-term visioning and short-term action);
- Key feature 3: Integrated policy learning (related to principle: reflexivity and learning).

Figure 2 below illustrates how the pre-selected governance for SD principles were embedded in the policy cycle. The overlap of policy cycle elements and governance for SD principles in Figure 2 form the analysis key features 1–3 in the Results Section:

- "Inclusive actor strategy" investigates government actor (category 1) and Non-government actor (category 2) involvement during the NMS design phase;
- "Strategic follow-up implementation" stresses the degree to which concrete follow up actions are foreseen (category 1) and to what extent time frames for implementation are linked to them (category 2); and
- "Integrated policy learning" deals with the degree of goal and target specification (category 1), as well as the availability of policy assessment tools, such as monitoring and evaluation mechanisms (category 2).

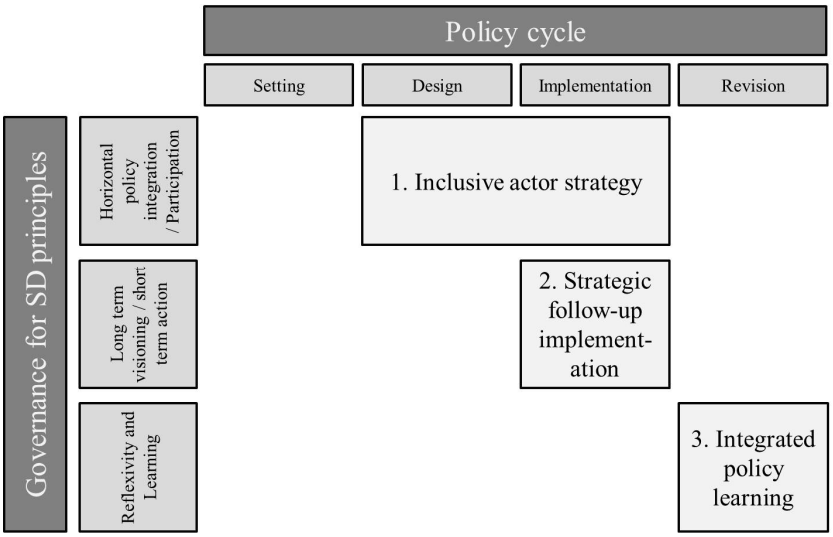

Figure 2. Analytical framework for governance for SD and respective analysis key features.

As such, our approach limits certain governance for SD principles to different stages in the policy cycle, whereas other approaches might focus on one principle along the whole cycle, or vice versa. Restricting our analysis to the policy cycle brings certain limitations, in particular, during the agenda-setting phase, which is a feature of the "clumsy solution" approach described above. Instead, our analysis provides a more comprehensive picture when the paper investigates "clumsy processes" along three stages of the policy cycle. In the subsequent analysis, the paper explores how NMS address "wickedness" of governing the sustainable and secure mineral supply through governance for SD principles. Moreover, the author attempts to identify best practices and key dynamics of the process through a comparative analysis of NMS in five EU MS.

6. Results

The first part of this chapter outlines the policy genealogy and how specific EU Member State conditions are considered. In the second part, the author analyses the degree to which governance for SD principles (see Table 1) are applied during the design, implementation, and revision stage of NMS. By doing so, the paper investigates key features: (1) inclusive actor strategy; (2) strategic follow-up implementation; and (3) integrated policy learning.

6.1. Policy Genealogy and Driving Forces

For all the five country cases (Austria, Finland, Greece, Portugal and Sweden), their current NMS was the first umbrella policy strategy encompassing a strategic approach towards a secure and sustainable supply to domestic mineral raw materials. Prior to this development, none of the five countries had a coherent and strategic approach. Instead, these countries only had a mix of stand-alone instruments addressing different issues, such as land-use planning (i.e., managing competing land use choices such as mining or agriculture), covering different materials and different industrial sectors. Only in the case of Greece was mineral policy managed through a tripartite approach of three different laws that formed a more coherent framework compared to the other four countries.

In four of the five countries (Finland, Portugal, Greece and Sweden), the EU level policy framework—the 2008 RMI—was the common driver for initiating the development of their NMS. The case of Austria is different in that the Ministry of Economy in 2001 proposed to the national parliament the development of an overall strategy for a more coherent policy approach. Consecutive parliamentary debates, on the one hand, and coordination and negotiation with the regions, on the

other hand, between 2001 and 2010 lead to the government's adoption of the NMS and its initiation in 2010.

Apart from the European Commission providing a major impetus for the development of NMS, national framework conditions strongly contributed to their development and focus. In the case of Sweden and Finland, economic factors played a major role. In these two countries, a "mining boom", due to increased investments in mining and exploration activities, led to augmented political awareness of the mining sector's activities. The Finnish interviewee highlighted that the "[. . .] strong increase in mining and exploration activities at national level, which brought the sector to the political agenda", went so far that "[. . .] minerals issues where mentioned in the government programme".

In contrast, environmental challenges and more effective land use planning (avoiding conflicts in use and guaranteeing access to important mineral deposits) were vital concerns for the development of the Austrian and Greek NMS. Moreover, in Austria and Greece, public acceptance for on-going and future mining projects influenced NMS development.

In addition, Table 2 provides some background information with regard to the country's domestic extraction figures, the socio-economic importance of the sector for employment, and the attractiveness for private sector investment according to the legislative and policy framework [74–76].

Table 2. Country background information on domestic extraction, employment and investment attractiveness.

	Austria	Sweden	Finland	Portugal	Greece
Domestic extraction of metal ores in 2016 (tonnes)	3319.089	79,028.485	21,972.056	11,881.668	4572.629
Domestic extraction of metal ores (per cent change 2000–2016)	+45.36%	+65.57%	+558.14%	+14.02%	−4.96%
Domestic extraction of non-metallic minerals in 2016 (tonnes)	108,641.427	99,591.772	98,433.49	101,071.714	57,288.256
Domestic extraction non-metallic minerals (per cent change 2000–2016)	−7.96%	+33.09%	−7.54%	−20.44%	+65.27%
Jobs in mining and quarrying in 2014 (employed persons)	6265	10,847	6318	9355	6037
jobs in mining and quarrying (per cent change 2008–2014)	−1.23%	+12.14%	+19.16%	−30.32%	+4.39%
Policy Perception Index in 2014 (Rank among 122 jurisdictions)	No data available	4th	2nd	40th	82nd

6.2. Inclusive Actor Strategy

The governance for SD principles "horizontal policy integration" and "participation" refer to (governmental and non-governmental) actor involvement throughout the whole policy cycle. The paper investigated the degree of actors' involvement during the design and implementation of the respective NMS

6.2.1. Participation of Actors in Strategy Design

Depending on where mineral policy was situated in the administration of the respective country, the Ministry of Environment (GR: Ministry of Environment, Energy and Climate Change, PT: General Directorate of Natural Resources, Security and Maritime Services) or the Ministry of Economics (Austria, Finland and Sweden) had the main responsibility for the policy design process.

The five countries are characterised by different degrees of actor collaboration during the NMS design phase: (1) "exclusive"/"limited"; (2) "partially inclusive"/"medium"; and (3) "fully inclusive"/"broad" strategy development processes. These categories refer to the degree of involvement of: (i) "governmental organisation actors" (GO actors i.e., ministries); and (ii) "non-governmental actors"

(Non-GO i.e., industry, academic and private research institutions, and civil society organisations, such as environmental NGOs). Figure 3 depicts the analysis categories in a two-dimensional graph.

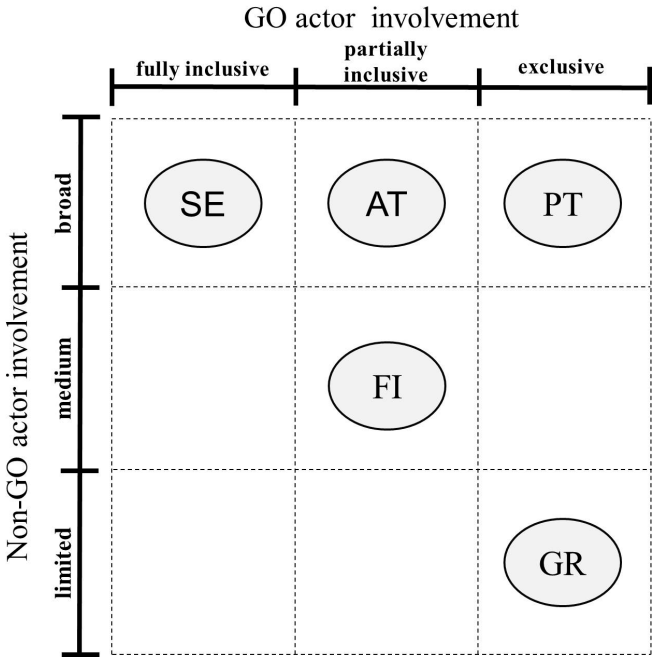

Figure 3. Analysis feature 1—inclusive actor strategy.

NB: *x*-axis analysis category "GO (ministry) actor involvement": Exclusive development (cooperation with only one other ministry); Partially inclusive development (two other ministries); fully Inclusive development (more than 2 ministries); SE was characterised by development process involving all ministries; *y*-axis analysis category "Non-GO actor involvement" (also including non-ministry government organisations such as local and regional authorities): Limited external involvement (industry; research—public or private; public body—only geological survey); medium external involvement (in addition other public bodies such as regional or local authorities, environmental agencies etc.); Broad external involvement (in addition other CSO stakeholders such as labour associations, environmental and social civil society organisations etc.).

The "exclusive" and "limited" design approach applied by the Greek Ministry of Environment involved only a limited number of GO and Non-GO actors. For example, only one industry association and two academic institutions have been involved in the NMS design process. The Greek interviewee explained that, because of the concentration of competences, the sole responsibility for developing the NMS was within one ministry: "[. . .] in the same ministry, we could solve the problems of mining from an economical, technological and environmental point of view".

Contrastingly, the Swedish NMS is characterised as being fully "inclusive" and uses a "broad" design approach. Not only have all government ministries been consulted and involved, but also a broad variety of Non-GO actors, covering industry, academic and private research, as well as civil society and environmental organisations. Essentially, as pointed out by the Swedish interviewee, policy-making processes in Sweden are characterised by a strong focus on collaborative approaches in the sense that "it is never one ministry which takes the decision; [. . .] in order to put forward a project like this, all the ministries have to approve".

Given the variety of different GO and Non-GO actors involved, the respective responsible ministries developed different coordination mechanisms (i.e., negotiating the content, commenting on drafts and providing expertise). For example, Greece applied a rather lose form of coordination by establishing informal ad-hoc and on-demand meetings between public administrators and Non-GO

actors involved. Contrastingly, Sweden, Finland, Austria and Portugal set up coordination mechanisms on a regular and pre-established basis (i.e., official meetings, such as internal working groups or plenary meetings). In the case of Sweden and Finland, decisions on high level political meetings, such as steering groups chaired by permanent ministry secretaries (FI) or ministers (SE), steered the work of these meetings. Essentially, interviewees from Sweden and Finland reported that high level political meetings positively affected commitment during later stage implementation, as "the steering group secured continued implementation efforts without budget allocation".

Both Austria and Finland are characterised by a "partially inclusive" design approach, involving two ministries (FI: the Prime Minister's Office and the Ministry of Employment and the Economy) in the process, but a varying degree of Non-GO involvement. Remarkably, in Finland, while not originally planned, Non-GO involvement increased considerably during later stage implementation: The Finnish interviewee described that during the policy design stage, the responsible ministry was not aware of the role environmental NGOs could play, for example, in facilitating a social license to operate. The interviewee explained that "[we thought], environmental issues were [sufficiently] covered by the Ministry of Environment and environmental authorities". The major impetus for involving Non-GO actors in the later stage originated in public debate: "In the years following the adoption of the 2010 strategy [. . .] the social license to operate principle became quite prominent in the public sphere—especially through the media—and, thus, NGOs and representatives of indigenous people have been involved in the further policy process (i.e., the 2013 action plan)". On the contrary, the Austrian approach intentionally and ex-ante decided to involve a variety of Non-GOs, as "mining and mineral extraction affairs are a sensitive case in Austria and, thus, it was very helpful to bring nearly all stakeholders together on one table [. . .] to facilitate required acceptance in long and intense sessions and negotiations".

While Portugal, Austria, and Sweden all shared a "broad" participation of Non-GO actors, the means of involvement during the design stage varied: In Austria, for example, an institutionalised form of involvement of business/industry associations and labour unions in the policy decision-making process ("Sozialpartnerschaft") played an important role for bringing in Non-GO perspectives. On the other hand, Sweden and Portugal engaged in a more deliberate and loose way of involvement: For example, the Swedish coordinating ministry organised four dialogue meetings and sent out requests for written feedback to 300 organisations, in order to "have as many people as possible attending and that anyone could provide input".

According to Prno and Slocombe [64] and Zhang and Moffat [5], the reasoning and benefits behind such multi-actor approaches are manifold: Involvement of different actors, as in the case of Portugal, Sweden and Austria, has the potential to bring the most controversial issues ex-ante into the policy debate and problem formulation process and, consequently, anticipate or mitigate potentially conflicting developments. The Swedish interviewee also indicated that "of course there were conflicting opinions between ministries during the design of the strategy, but such conflicts had to be resolved before the strategy was adopted at the ministerial meeting and, thus, became a governmental decision". Similarly, the Austrian interviewee reported that "reaching acceptance required long and intense sessions and negotiations with stakeholders". However, broad actor involvement fulfilled a dual purpose with regard to: (i) expertise by "bringing experts of the respective stakeholder groups together to analyse the topics at hand"; and (ii) legitimisation by "bringing nearly all stakeholders together at one table, and, especially, those that are usually opposed to mineral extraction [. . .]".

6.2.2. Participation of Non-GO Actors in Strategy Implementation

The paper subsequently explored the extent to which Non-GOs are taken on board during the implementation of actions of the respective NMS. The author identified three different approaches for strategy implementation and the role Non-GOs play: (1) "on-demand collaborative implementation"; (2) "shared but differentiated implementation"; and (3) "consult-and-forget implementation". With regards to "on-demand collaborative implementation", the Greek NMS was mainly implemented

by ministries (i.e., Ministry of Environment supported by other ministries where responsibilities overlap), while Non-GOs were involved on an ad-hoc and on-demand basis in consultation procedures or committees. The Austrian NMS presents a similar case: The interviewee argued that Non-GO involvement was limited to a supportive role during the policy design phase due to the fact that responsibility for implementing the main policy instrument (i.e., land use planning) was not located on national ministerial level, but rather on the level of the nine Austrian regions.

An implementation approach with a higher degree of Non-GO involvement, "shared but differentiated implementation", was applied in the NMS of Sweden and Portugal: The Swedish government appointed other public authorities (e.g., geological survey innovation agencies, regional authority) responsible for implementation of individual actions, supported by a range of Non-GO actors. More specifically, the government provided the framework conditions (i.e., financing, goals and targets, time-frames, monitoring), whereas public authorities enjoyed a considerable degree of freedom and independence during the implementation process. However, the Swedish interviewee pointed out that the government advises the authorities to "[. . .] consult with the relevant stakeholders [...] and in some cases [we] mention with which stakeholders [we] want the authorities to collaborate with". A similar approach was applied in Portugal, where GO actors are fully responsible for individual actions, while Non-GO actors play a supportive role during implementation.

In contrast to the design phase, Finland's NMS allowed for the highest level of involvement and autonomy during implementation compared to the other four cases. Generally, the responsibility for implementing action proposals (outlined in the 2013 action plan) is split between different Non-GO actors. Government steering is limited, insofar as the action plan only comprises non-binding advice on the actors' involvement and provides opportunities for new actors entering action proposals. Actors leading proposals make up a broad variety, such as industry associations or environmental NGOs. As outlined in the previous section, the major impetus for involving Non-GOs in the later implementation stage came from the public sphere and the media. Finland, Sweden and Portugal featured less inclusive actor participation during NMS implementation than design.

Since primary extraction challenges necessitate such multi-actor approaches (see also [4,5,64]), these policy strategies, on the one hand, contribute to increased legitimacy for steering, and, on the other hand, facilitate implementation of individual actions. More specifically, as outlined by several authors [11,57,60], establishing more inclusive participation can positively impact, for example, on public perception of mining or the social license to operate. Conversely, while the Greek NMS identifies conflicts with local communities for on-going and future mining projects as one of the major drivers for its inception, Non-GO involvement during both design and implementation remained limited. Following these arguments, this might have future ramifications on building trust for a social license to operate.

6.3. Strategic Follow-Up Implementation

This part of the analysis addresses the governance for SD principle "long-term visioning and short-term action". The author examined how NMS define a long-term vision for minerals supply in the context of SD. More concretely, the analysis focuses on the extent to which the NMS outlines a concrete strategy follow-up (i.e., action plan/follow up implementation plan) and implementation time planning.

To better understand the nature of different NMS' follow-up implementation, the author categorised the following: (1) "single action only"; (2) "partial" implementation; and (3) "elaborated" action plan for implementation. The author also distinguishes between three classifications for implementation time frames: (1) "unspecific/undifferentiated"; (2) "overall/end-of-strategy"-based; and (3) "differentiated/individual action"-based.

NB: *x*-axis analysis category "Concrete strategy follow up": single action only (i.e., no concrete implementation plan/implementation steps foreseen for actions outlined in the strategy; follow up of actions in an ad-hoc and un-systematic way); Partial (i.e., includes some planning aspects

such as a financing of actions in the implementation framework); Elaborated (existence of a follow up implementation or action plan of the Strategy); *y*-axis analysis category "Implementation time planning": No time planning (i.e., un-specified time plan for action implementation); overall/end-of strategy (i.e., overall but un-differentiated time planning exists for all actions); Differentiated/individual action based (i.e., comprehensive time-planning differentiated among various actions).

At a first glance, the patterns of specific time frames, actions, and overall implementation frameworks formed two rather homogenous groups among the five NMS (see also Figure 4). While Greece, Austria, and Sweden lack a concrete implementation plan or roadmap, Finland ("Sustainable Extractive Industry Action Plan") and Portugal ("Action Plan ENRG-RM 2020") have both developed a separate action plan.

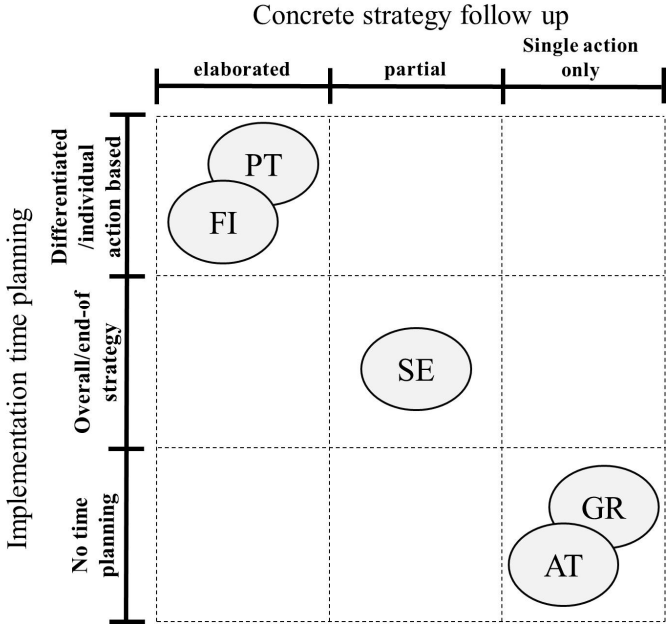

Figure 4. Analysis feature 2—Strategic follow-up implementation.

For Austria and Greece, the author identified a "single action only" implementation scheme (no concrete action plan or implementation framework) with an "unspecific/undifferentiated" time schedule for individual actions. The Greek interviewee explained that, for the NMS, there exists "[. . .] no concrete time plan from the beginning [. . . and that the] strategy is quite general". Slight variations exist with regard to time planning: While the Greek NMS pursues a mix of short- and long-term actions, the Austrian NMS' major instrument is under continuous negotiation with the regions for changing their legislation accordingly. Thus, the author characterised their implementation as a continuous process with no concrete time planning.

The "partial" and "overall/end-of-strategy-based" implementation in Sweden refers to an implementation framework that considers both an overall time frame (three years) for short- and longer-term actions, as well as a specific financial framework for that given period. Remarkably, in the case of Sweden, the interviewee pointed out that the " . . . government provides the authorities (e.g., geological survey innovation agencies, municipalities) with the overall framework until 2016, and they develop the tasks as they see fit", and, moreover, that "[. . .] it gives quite a lot of freedom to the authorities to develop from their expertise and knowledge".

The "elaborated" and "differentiated-individual-action" implementation in Finland and Portugal relates to a policy action plan that encompasses differentiated and specific implementation time frames across clearly specified short- and longer-term actions. In this regard, the Portuguese action plan offers

a well differentiated approach on the level of individual actions: The interviewee highlighted that the actions are comprehensively outlined by (1) an "[. . .] indication of sponsors (i.e., funding sources) [. . .] (2) stakeholder consortia for implementing individual actions [as well as] (3) the macro calendar (i.e., overall time planning of the action plan) [and], a detailed timetable for action [representing] the model, to accompany each course of action".

6.4. Integrated Policy Learning

Another important building block of governance for SD refers to the concept of "reflexivity and learning" as an ability to adapt to changing conditions within a given system. The following highlights instruments for monitoring and evaluation applied in NMS to either adapt to changing framework conditions or respond to varying degrees of action implementation and follow-up of targets. Moreover, to enable policy learning—e.g., to link the overall strategy level with concrete and individual implementation actions—there needs to be overall and broad objectives on the level of the NMS, and, at the same time, targets and indicators attributable to individual implementation actions and actors.

Thus, for the analysis feature "integrated policy learning" (Figure 5), the paper further distinguishes between two conceptually related categories: The availability of overall objectives in combination with measureable targets ("objective and target specification"), providing clear guidance for implementation by means of various "monitoring and evaluation tools".

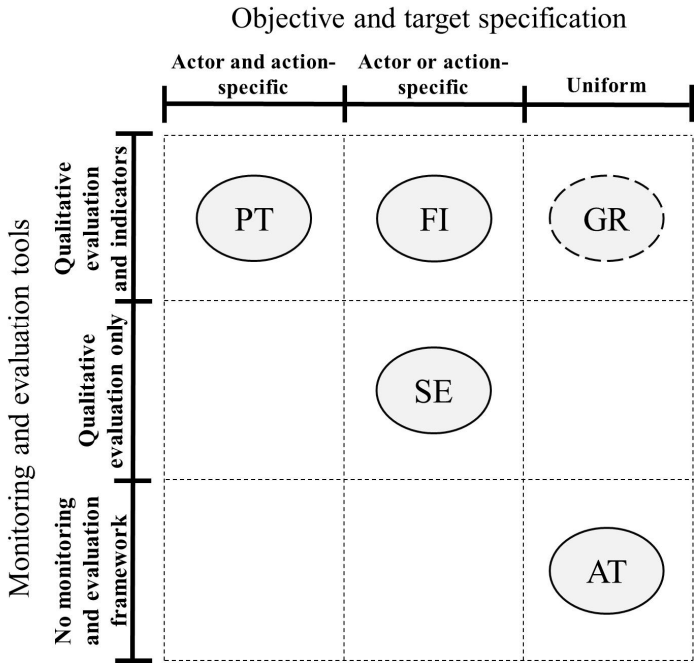

Figure 5. Analysis feature 3—Integrated policy learning.

NB: *x*-axis analysis category "objective and target specification": uniform (the strategy only comprises overall and uniform objectives which cannot be attributed to specific actors or specific actions foreseen; actor or action-specific (targets can be attached to single/individual actions or actors); actor and action-specific: *y* axis analysis category "monitoring and evaluation framework": no monitoring and evaluation framework (i.e., no indicator framework or qualitative reporting); Qualitative evaluation only (i.e., assessment and evaluation report); qualitative evaluation and indicator frameworks.

Generally, the five NMS exhibit quite diverse policy learning systems, ranging from applying simple mechanisms of monitoring and reporting, towards more sophisticated and comprehensive approaches for institutionalised learning in NMS.

Greece reported nine broad objectives in its NMS, for which no monitoring or evaluation mechanism (i.e., no indicator or qualitative evaluation frameworks) exists. However, efforts are currently being undertaken to develop a monitoring framework and a list of quantifiable targets. Similarly, in Austria, the main criteria for successful implementation is the translation of the major instrument (land use planning law) into regional law. However, no current monitoring and evaluation system exists to measure its implementation progress at the federal level.

The Swedish NMS applies a mixed approach of two horizontal objectives that are complemented by several targets linked to 12 action areas. However, no concrete indicator framework exists for measuring these targets. Instead, the responsible authorities produce a yearly qualitative evaluation report. This report not only informs the government and all involved actors, but also a wider group of stakeholders at a yearly forum meeting.

On the other end of the scale, Finland and Portugal developed the most comprehensive system in terms of monitoring and evaluation tools. Both Finland's and Portugal's NMS feature quantitative, as well as qualitative, policy assessment schemes. Finland's monitoring and evaluation approach developed not only the assessment of progress for individual actions (i.e., benchmarking for measuring progress towards the target), but also assessed the impact of its individual actions (i.e., the actual impact on the ground).

7. Discussion

The selected five EU Member States NMS demonstrate diverse governance constellations when combining the three analysis key features of governance for SD (see Table 2). It is interesting to observe that, while all five NMS follow the same strategic objective of establishing a secure and sustainable supply of mineral raw materials, notable differences exist regarding their governance for SD approaches. Although no "one-size-fits-all" recipe for a best practice case exists among the five NMS, Portugal, Finland, and Sweden meet high standards with regard to the inclusion of governance for SD principles as a "clumsy solution" approach to a "wicked problem". Therefore, the author argues that these three NMS provide the best governance framework conditions for achieving secure mineral supply in the context of SD. In this regard, Table 3 displays the five NMS point scores according to their position in the coordinate system in each of the three analysis features (see Figures 3–5).

Table 3. Comparison of the three analysis features depicting different governance for SD constellations in five EU MS NMS.

	Inclusive Actor Strategy						Strategic Follow up Implementation						Integrated Policy Learning					
Portugal																		
Finland																		
Sweden																		
Austria																		
Greece																		

NB: Table 3 represents point scores (i.e., coloured boxes) according to the country's position on the system of coordinates in each of the three analysis features: e.g., In analysis feature 1 "Inclusive actor strategy" Sweden being situated in the upper left corner scores three points for the *y*-axis and

the *x*-axis analysis category, respectively (totalling six points), whereas Finland situated in the centre scores two points for the *y*-axis and the *x*-axis analysis category, respectively (totalling four points).

Briefly, the paper discusses here how the application of governance for SD principles in NMS as a "clumsy solutions" approach can help to address the "wicked problem" of sustainable mineral supply. The author does so by outlining the implications of our three analysis key features on the characteristics of "wicked problems", in general, as well as on the concrete example of mineral supply challenges:

- Sustainable mineral supply is characterised by "wicked problem" dynamics, such as different actor interests and capacities ("social pluralism"), organisational fragmentation or silo-thinking ("institutional complexity"). Thus, the more inclusive strategies of Sweden, Austria and, to a lesser extent, Finland and Portugal, support respective "clumsy" solution approaches or, more specifically, more deliberative or participatory policy-making. As also outlined by Everingham et al. [4] (pp. 597–598), these NMS potentially contribute to (i) responsibility sharing; (ii) increased legitimacy for steering; (iii) design and implementation of policy instruments (e.g., land use planning tools or licensing procedures considering civil society interests); or (iv) translating these efforts or attitudes into a local context, where social license to operate is particularly relevant. Creating this arena and culture for participatory decision-making in NMS potentially facilitates trust and cooperation among actors in sustainable mining projects on the ground [5,60,64]. Conversely, in Greece, where, according to Menegaki and Kaliampakos [8] (p. 1437), "reactions against mining remain intense", efforts on participatory policy-making are marginal compared to other EU MS NMS and, thus, may cause less favourable framework conditions.
- Mining sector challenges, such as mining impacts on ecosystems, or business investment decisions for prospection, have to deal with institutional complexity and unknown long-term dynamics in the future. Thus, a "clumsy" solution approach needs to consider both long-term visioning and short-term action, as well as integrative implementation. In that sense, Finland and Portugal provide a best practice case through a balanced combination of (i) long-term envisioning (i.e., a set of broad objectives), and, at the same time; (ii) strategic design for concrete actions (i.e., policy action plan) that provide clarity for future policy developments [77]. As outlined by Head and Alford [13] (p. 731), flexible framework conditions (degrees of financial and steering freedom for individual action) combined with collaborative leadership (i.e., multi-actor consortia), as applied by Sweden, Finland and Portugal, allow for more adaptive and context-specific implementation.
- The fact that there exists no blueprint for a sustainable extractive sector, and that information needed to take adequate policy decisions is fragmented ("scientific uncertainty"), requires continuously evaluating and adapting current practices. Thus, applying integrated policy learning approaches (e.g., combining qualitative and quantitative evaluation) allows for both reflexivity and learning. Essentially, countries, such as Sweden and, to a lesser extent, Finland, facilitate this flexibility through a comprehensive policy revision process and reduce uncertainty by bringing in collective knowledge from more inclusive policy design and implementation. Contrastingly, Hertin et al. [78] (p. 1185) argue that the actual synergetic relationship is questionable, as, for example, more instrumental and formal policy learning approaches can act as a barrier to open deliberation and the utilization of stakeholder knowledge.

However, as outlined by Jordan [16], it is yet to be explored whether there exists a direct causal relationship between governance for SD approaches and the actual policy outcomes "on the ground". Even though our results indicate that most NMS are fairly well outfitted with governance for SD processes, we need further research about their actual contribution to achieving policy goals. Taking into account that governance for SD tries to remedy most common policy implementation failures. As outlined by Howes et al. [79], NMS can be considered as a framework facilitating policy implementation at the strategic level.

Particularly, when drawing lessons from SD policy-making, the task ahead for mineral policy practitioners appears to be not less ambitious: One could argue that while SD practitioners, despite their in-depth understanding and decade-long experience in dealing with "wicked problems" (a sustainable development transition), have struggled to achieve policy goals [80–82], it does not mean that it is not worth trying to implement "clumsy solution" approach of governance for SD in NMS for mineral policy practitioners. Given the large amount of sectoral strategies, an investigation of the actual "policy content" (for examples see [29]) would add to the understanding of governance approaches effectively delivering policy goals. To capture the impacts of different governance approaches, Lange et al. [83] emphasize the need to investigate relationships among political processes (politics), institutional structures (polity), and policy content (policy) (see also [84,85]). As is the case within this paper, there are a few examples where general institutional structures affect governance processes in EU MS mineral policy: The involvement of business/industry associations and labour unions in the policy decision-making process ("Sozialpartnerschaft") in Austria, or high level political steering meetings in Sweden or Finland. Thus, future research on politics, policy and polity aspects in different EU Member States and their contextualisation with different governance approaches would allow for a more nuanced picture.

While Lange et al. [83] argue for a more contextualised picture of governance approaches, our analysis bridges the theoretical with the practical perspective: the paper investigated whether policy strategies are fit-for-purpose regarding their translation into practice of prescriptive and normative governance for SD principles. Or, paraphrasing the view of Lafferty and Meadowcroft [86] (p. 2), the author strived to not only add to the "great deal of discursive 'smoke'", but also to provide "[. . .] empirical 'fire'". More specifically, these NMS display practical examples for the integration of governance for SD in sectorial concerns with both high political relevance for the EU Commission (EU RMI, EIP raw materials) and EU MS level, as well as contested societal/social and environmental challenges. Thus, applying appropriate governance processes offers both an opportunity and a challenge for mining sector actors, as well as proponents of SD. Our paper, therefore, contributes not only to a wider debate in academia, but also informs policy practitioners along two fronts: Firstly, mineral policy practitioners who are primarily concerned about governance processes and their implications for delivering policy goals. Secondly, SD policy practitioners who are interested in how a governance for SD framework is implemented in sectoral policy settings, especially at times when SD remains marginalised or camouflaged [87] (p. 967).

8. Conclusions

By utilising a broad framework of governance principles and investigating whether these can be found in policy strategies, the author demonstrated how public institutions deal with "wicked problems". The paper provided a nuanced picture on practical applications of these governance principles along the whole policy cycle and identified fit-for-purpose approaches best reflecting each aspect of the selected governance for SD spectrum. The author argues that decision makers need to pursue this maxim of holisticity to address the entirety of a "wicked problem's" dynamics, and, consequently, set the right framework conditions to achieve sustainable development in the mining sector. Public institutions adopting such an approach will benefit from increased commitment and legitimacy, as well as more effective policy instrument implementation in the future and, thus, be more likely to achieve policy outcomes. Beyond the arena of mineral policy, such approaches will be particularly relevant for upcoming EU MS Strategies following up on recent developments, such as the 2030 Agenda for Sustainable Development (see for example [42]) or the EU Action Plan for the Circular Economy.

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Appendix A

Interviewee for National Strategy for Geological Resources—Mineral Resources: Director of the Mines and Quarries Department responsible for supervision of the mining and quarrying activities within its legal framework part of the Direção-General de Energia e Geologia DGEG belonging to the Ministry of Environment, Land Use Planning and Energy (MAOTE).

Interviewee for Sweden's Minerals Strategy: Head of Section; Ministry of Enterprise, Energy and Communications; project leader of the mineral strategy.

Interviewee for Greek National Policy for the Exploitation of Mineral Resources: Head of the department of safety and regulations in the General Directorate of Natural Wealth; Ministry of Environment, Energy & Climate Change of the Hellenic Republic; in charge of NMS co-development with other colleagues in the Directorate.

Interviewee for Austrian Mineral Resources Plan: Head of Unit—Minerals policy; Federal Ministry of Science, Research and Economy; person in charge of co-development of the Austrian Rohstoffplan.

Interviewee for Finland's Minerals Strategy: Chief Inspector of Mines, Mineral Policy and Legislation; Ministry of Employment and the Economy (FI); person in charge of national mineral policies.

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